

COLOR VIDEO CAMERA
1.5INCH ELECTRONIC VIEWFINDER
ZOOM LENS
TRIPOD ATTACHMENT

DXC-M7P/M7PM DXF-M7/M7CE VCL-915BYA VCT-14


VOL. 1

GENERAL DESCRIPTION
SERVICE INFORMATION
ALIGNMENT



SONY®
SERVICE MANUAL

SAFETY RELATED COMPONENT WARNING

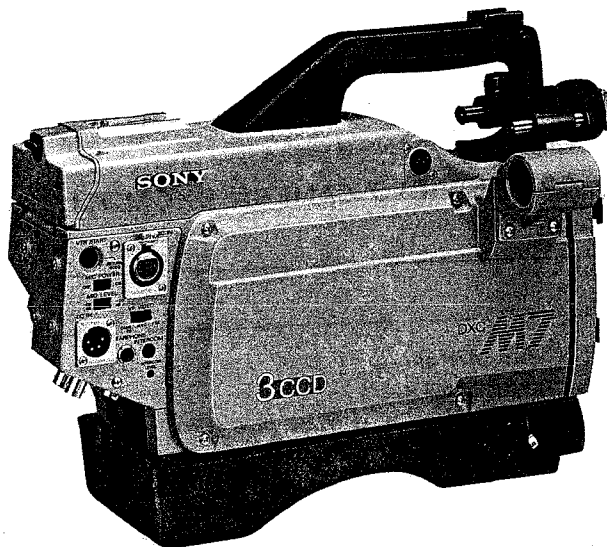
Components identified by shading and  marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

DXC-M7P/M7PM

COLOR VIDEO CAMERA



SPECIFICATION

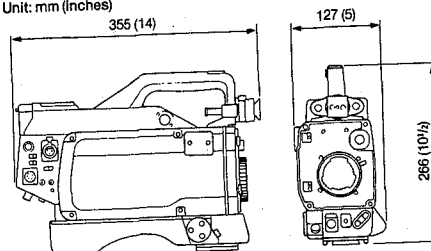
Camera (DXC-M7/M7P)

Image device	Interline-transfer CCD, 3-chip
Picture elements	768 × 493 (h/v, DXC-M7) 786 × 581 (h/v, DXC-M7P)
Sensing area	8.8 mm × 6.6 mm (equivalent to a 2/3-inch pickup tube)
Built-in filters	1: 3200 K 2: 5600 K + 1/4 ND 3: 5600 K 4: 5600 K + 1/4 ND
Lens mount	Bayonet mount
Signal system	EIA standards, NTSC color system (DXC-M7) CCIR standards, PAL color system (DXC-M7P)
Scanning system	525 lines, 2:1 interlace, 30 frames/sec. (DXC-M7) 625 lines, 2:1 interlace, 25 frames/sec. (DXC-M7P)
Scanning frequency	Horizontal: 15.734 kHz Vertical: 59.94 Hz (DXC-M7) Horizontal: 15.625 kHz Vertical: 50 Hz (DXC-M7P)
Sync system	Internal External with the composite video or black burst signal supplied to the GEN LOCK input connector or the reference signal input to the 26-pin connector from the GEN LOCK connector of the CCU-M7/M7P or CCU-M3/M3P
Horizontal resolution	700 lines (center)
Minimum illumination	26 lux with F1.8, +18 dB 2,000 lux with F5.6, at 3200 K
Sensitivity	0 dB, 9 dB or 18 dB, selectable
Gain selection	Composite video: 1.0 V (p-p), sync negative, 75 ohms, unbalanced
Video output	Y/C separate: Y: 1.0 V (p-p), sync negative, 75 ohms, unbalanced C: Burst level 0.286 V (p-p), 75 ohms, unbalanced Y/R-Y/B-Y component: Y: 1.0 V (p-p), sync negative, 75 ohms, unbalanced R-Y: 0.525 V (p-p), 75 ohms, unbalanced B-Y: 0.525 V (p-p), 75 ohms, unbalanced
Signal to noise ratio	60 dB (DXC-M7) 58 dB (DXC-M7P)
Registration	0.05 % for Zone I 0.05 % for Zone II 0.05 % for Zone III

Inputs/Outputs	26-pin connector: Sony Z-type DC IN: XLR-type, Male, 4-pin MIC IN: XLR-type, Female, 3-pin, balanced GEN LOCK: BNC-type, 75 ohms, unbalanced VIDEO OUT: BNC-type, 75 ohms, unbalanced LENS: 12-pin VF: 8-pin LENS REMOTE: 6-pin REMOTE: 10-pin EARPHONE: minijack INTERCOM: mini intercom jack
Power requirements	12 V DC
Power consumption	16 W (for camera only)
Operating temperature	-10 °C to +45 °C (14 °F to 113 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to 140 °F)
Weight	3.6 kg (7 lb 15 oz)

Dimensions

Unit: mm (inches)



SONY®

SERVICE MANUAL

COLOR VIDEO CAMERA DXC-M7PM

NOTICE

Please read the model number DXC-M7/M7P as "DXC-M7PM" wherever it appears in the general description of SECTION 1.

The DXC-M7PM is different from the DXC-M7/M7P in the following ways.

Signal system

Your color video camera, DXC-M7PM, is designed for the PAL-M color system. It must be used with video equipment which matches its signal system. Usually, such equipment is identified as a PAL-M model by the code "PM" at the end of its model number.

Please read the model numbers of recommended equipment and optional accessories as follows wherever they appear in the manual:

Special effects generator:

SEG-2550/2550P as SEG-2550PM

SEG-2000A/2000AP as SEG-2000APM

Universal chroma keyer:

CRK-2000/2000P as CRK-2000PM

Wipe pattern extender:

WEX-2000/2000P as WEX-2000PM

Portable videocassette recorder:

BVU-150/150P as BVU-150PM

If a CCU-M3/M7 series camera control unit is to be connected, use a CCU-M3/M7, not a CCU-M3P/M7P. For questions concerning other recommended equipment and optional accessories available in your country, please consult your authorized Sony dealer.

Composition

In "Composition" on page 3 in the instruction manual, three types of color video camera kits are described. However, only one type of kits is available in your country: the DXC-M7PMK.

The DXC-M7PMK is composed of the following components:

Color video camera: DXC-M7PM

Zoom lens: VCL-915BYA

Viewfinder: DXF-M7

Carrying case: LC-M7G

Camera cable: CCZQ-2A

Tripod attachment: VCT-14

Microphone holder: CAC-1

Flange focal length adjustment chart

Specifications

- Signal system: PAL-M color system
- For the items which comprise specified values for both the NTSC and PAL models, such as "Picture elements", "Scanning system", "Scanning frequency", "Sensitivity", "Signal to noise ratio", the specifications for the NTSC model are applied.

TABLE OF CONTENTS

VOL. 1

1. GENERAL DESCRIPTION

Composition	1-1
Outline	1-2
Features	1-2
Precautions	1-3
Special Characteristics of a CCD	1-3
Location and Function of Controls	1-4
DXC-M7/M7P Color Video Camera Head ..	1-4
VCL-915BYA Zoom Lens	1-8
DXF-M7/M7CE Viewfinder	1-10
Attaching Accessories	1-12
Attaching a Lens	1-12
Attaching a Viewfinder	1-13
Adjusting the Viewfinder Position	1-14
Attaching a Microphone	1-15
Attaching a Battery Adaptor	1-16
Attaching to a Tripod	1-17
Connecting the Video Camera to a VTR	1-18
Connecting to a Portable VTR	1-18
Connecting to an S-VHS Format Portable VTR	1-19
Operating Conditions and Functions of the Connected VTR	1-20
Connecting to a Table-top VTR	1-21
Power Sources	1-22
(1) Power from the DC IN Connector	1-22
(2) A built-in NP-1A Battery Pack	1-23
(3) Power from the 26-pin Connector	1-23
Basic Operation	1-24
Advanced Operation	1-26
Adjusting a Viewfinder	1-26
Adjusting a Video Monitor	1-27
Zooming	1-28
Close-ups	1-29
Adjusting the Iris	1-30
Selecting an Optical Filter	1-31
Selecting the Gain of the Video Circuit	1-31
Adjusting the Flange Focal (Ff) Length	1-32
Adjusting the Black Balance and Black Set ..	1-33
Adjusting the White Balance	1-34
Warning Indications and Character Display ..	1-36
Warning Indications	1-36
Displaying the Switch Setting	1-37
Checking and Changing the Switch Setting ..	1-38

Studio Use	1-41
Connecting the Camera to the CCU-M7/ M7P Camera Control Unit	1-41
Connecting the Camera to the CCU-M3/ M3P Camera Control Unit	1-42
Use of the GEN-LOCK Connector	1-44
Examples of System Connections	1-45
Connections for the Studio System	1-45
Connections for the Outdoor System	1-45
Hints for Better Shooting	1-46
Understanding Light and Color	1-46
Basic Camerawork	1-47
Cutting	1-50
Lighting	1-51
Accessories Supplied	1-52
Optional Accessories and Recommended Equipment	1-52

2. SERVICE INFORMATION

2-1. Board Layout	2-1
2-2. Removal of the Outer Covers	2-2
2-3. Replacement of the Main Parts	2-3
2-3-1. Replacing the Front Unit	2-3
2-3-2. Replacing the Filter Plate	2-4
2-3-3. Replacement of TG Board	2-5
2-3-4. Replacement of DR Board	2-6
2-4. Connectors and Cables	2-7
2-4-1. Connector Input/Output Signals	2-7
2-4-2. Connections	2-12
2-4-3. Disconnection of CCZ/CCZJ/CCZQ Connectors	2-13
2-4-4. Cable Wiring	2-14
2-5. Internal Switch Settings	2-16
2-6. Notes on Servicing	2-22
2-7. System Block Diagram	2-23

3. ALIGNMENT

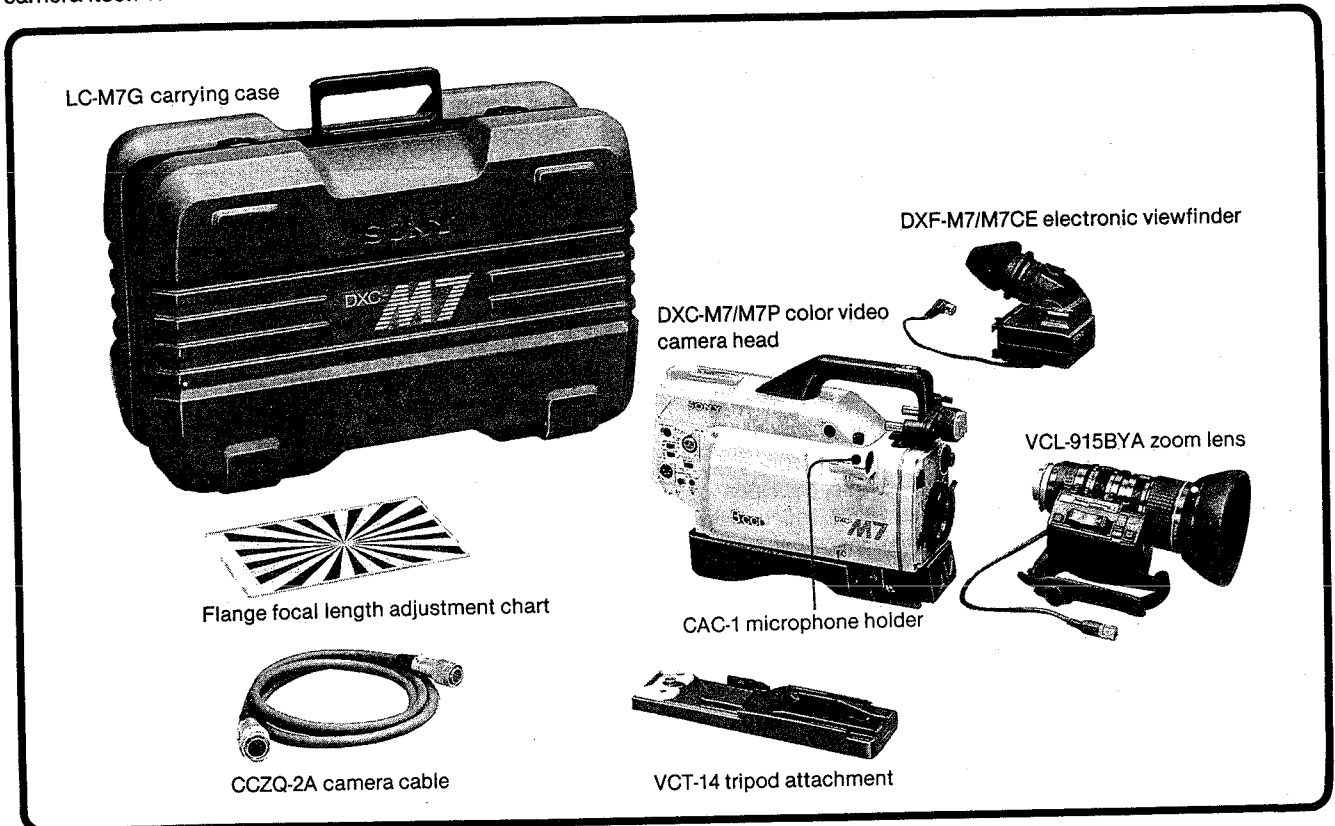
3-1. Preparation	3-1	Step 36. H/V RATIO Adjustment	3-60
3-1-1. Equipment Required	3-1	Step 37. Detail Amount Adjustment	3-61
3-1-2. Connections	3-3	Step 38. Zebra Level Adjustment	3-62
3-1-3. Initial Setting	3-4	Step 39. SYNC & SET UP Level Adjustment	3-63
3-1-4. Notes on Adjustment	3-5	Step 40. VTR Y Level Adjustment	3-64
3-1-5. Name of Switches and Selectors on Each Board and Their Arrangement	3-6	Step 41. VTR R-Y Level Adjustment	3-65
3-1-6. How to Make a Jig	3-11	Step 42. VTR B-Y Level Adjustment	3-66
3-2. Overall Adjustment	3-12	Step 43. SEP-ed Y Level Adjustment	3-67
Step 1. +9.5 V/9 V Adjustment	3-13	Step 44. SEP-ed CHROMA Level Adjustment	3-68
Step 2. Batt Alarm Adjustment	3-14	Step 45. Resolution Adjustment	3-69
Step 3. Sub Carrier Frequency Adjustment	3-15	Step 46. Auto Iris Adjustment	3-72
Step 4. SYNC Width Adjustment	3-16	Step 47. Low Video Adjustment	3-73
Step 5. SYNC Phase Adjustment	3-17	Step 48. Side Tone Adjustment	3-74
Step 6. Burst Flag Adjustment (For PAL)	3-18 (1)	3-3. Partial Adjustment	3-76
Step 6. Burst Flag Adjustment (For PAL-M)	3-18 (2)	3-3-1. Partial Adjustment Flowchart for Each Board	3-77
Step 7. V BLKG Width Adjustment	3-19		
Step 8. INT SC Phase Adjustment	3-20		
Step 9. BARS Level Adjustment	3-21	4. BLOCK DIAGRAMS	
Step 10. EN Y Level Adjustment	3-22	5. SEMICONDUCTOR	
Step 11. Monitor Out Level Adjustment	3-23	6. SCHEMATIC DIAGRAMS AND BOARD ILLUSTRATIONS	
Step 12. Carrier Balance Adjustment	3-24	7. SPARE PARTS	
Step 13. Color Bar Adjustment	3-25		
Step 14. Color Vector Adjustment	3-27		
Step 15. PA Carrier Balance Adjustment	3-28		
Step 16. VA Video Level Adjustment 1	3-29		
Step 17. VA Video Level Adjustment 2	3-30		
Step 18. Test Waveform Level Adjustment	3-31		
Step 19. G (1H) Out Level Adjustment	3-32		
Step 20. G (2H) Out Level Adjustment	3-33		
Step 21. 1H, 2H Delay-Signal Phase Adjustment	3-34		
Step 22. Gamma Set Adjustment	3-36		
Step 23. G/B/R Offset Adjustment	3-38		
Step 24. G/B/R V MOD Adjustment	3-39		
Step 25. Black Set Adjustment	3-40		
Step 26. Pedestal Adjustment	3-41		
Step 27. Flare Adjustment	3-42		
Step 28. PR Output Level Adjustment	3-43		
Step 29. Gamma Correction Adjustment	3-44		
Step 30. Manual Knee Adjustment	3-49		
Step 31. Auto Knee Adjustment	3-51		
Step 32. White Clip Adjustment	3-53		
Step 33. Crispening Adjustment	3-55		
Step 34. HF Offset Adjustment	3-57		
Step 35. HF Level Adjustment	3-59		

SECTION 1 GENERAL DESCRIPTION

Composition

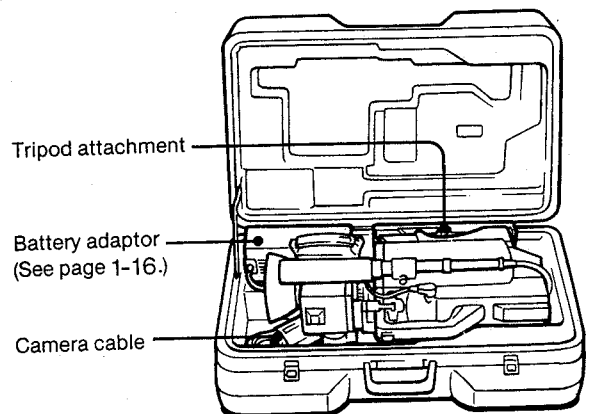
The DXC-M7/M7P, the DXC-M7K/M7PK and the DXC-M7H/M7PH comprise slightly different components, as noted below. However, the operating procedure for the camera itself is the same.

If you use a zoom lens other than the VCL-915BYA zoom lens, refer to the lens' instruction manual for information about its operation.



Model	DXC-M7 /M7P	DXC-M7K /M7PK	DXC-M7H /M7PH
Composition			
DXC-M7/M7P color video camera head	Yes	Yes	Yes
VCL-915BYA zoom lens	No	Yes	No
DXF-M7/M7CE electronic viewfinder	Yes	Yes	No
LC-M7G carrying case	Yes	Yes	No
CCZQ-2A camera cable	Yes	Yes	No
VCT-14 tripod attachment	Yes	Yes	No
CAC-1 microphone holder	Yes	Yes	No
Flange focal length adjustment chart	Yes	Yes	Yes

Packing



Outline

Features

The DXC-M7/M7P is a portable color video camera which uses a newly developed 3-chip CCD (Charge Coupled Device) solid state image sensor which has 380,000 (DXC-M7)/460,000 (DXC-M7P) effective picture elements.

Thanks to small-size and light-weight, the camera can be used for program production, news gathering, etc. for easy handling and portability when used with a portable videocassette recorder.

Adoption of CCD

- Incorporation of a 3-chip CCD results in a compact, light-weight camera body which consumes less power than does a camera using pickup tube(s).
- Low lag, high resistance to image burning and no deflection distortion.
- The CCD is not affected by vibration and mechanical shock.
- The CCD imager is not influenced by terrestrial magnetism.
- Thanks to the high signal-to-noise ratio, the video gain can be increased by 9 dB or 18 dB, which makes it possible to shoot a picture under low light conditions.
- The electric shutter enables the DXC-M7/M7P to produce clear images in still or slow-motion playback even when the objects are moving at very high speeds.

Power sources

- An NP-1A battery pack (optional) can be installed into the DXC-M7/M7P. The camera and 1.5-inch viewfinder can be used for about 70 minutes with a fully charged NP-1A.
- When a DC-8 battery adaptor (optional) is attached and two NP-1As are installed in it, the camera can be used continually for about 140 minutes.
- The power can be supplied to the camera from a portable VTR or from the CCU-M7/M7P, CCU-M3/M3P camera control unit.
- A CMA-8/8CE camera adaptor (optional) is needed if the camera is to be used with the AC power source.

Various connection capability

- The camera can be connected to a U-matic VTR or "Betacam" VTR.
- The camera can be used as a studio camera when connected to the CCU-M7/M7P, CCU-M3/M3P camera control unit.
- The camera can be connected to an S-VHS format videocassette recorder.

Automatic adjustment and memory functions

- The white balance and black balance are automatically adjusted by a built-in microprocessor. The adjusted values are retained for a long period of time while the camera's power is off.
- The black set is automatically adjusted, together with the black balance.

Display and related function

- Character display function
The built-in character generator displays the operational status of the camera and the warning indications on the viewfinder.
- Warning function
The REC indicator on the viewfinder blinks if the connected VTR malfunctions.
- Zebra pattern display
Zebra pattern appears on the viewfinder screen where the video level is about 70 IRE. This pattern provides a useful reference when the operator manually adjusts the iris.

Easy to operate the viewfinder

- The diopter can be adjusted to accommodate the operator's visuality.
- The viewfinder can be moved forward and backward.

Other features

- Four kinds of optical filters are built-in.
- Color bar signal can be output.
- Thanks to the Dynamic Contrast Control (DCC) circuit, a wide dynamic range which will allow light with an intensity level up to six times greater than that of normal light can be obtained.
- Magnesium die-cast body makes the camera solid and light-weight.

Precautions

Safety

- Operate the camera only on 12 V DC. For operation from an ac power line, use the camera adaptor recommended for this camera. Do not use any other camera adaptor.
- Allow adequate air circulation to prevent internal heat build-up.

Operation

- Do not operate the camera outside a -10°C to $+45^{\circ}\text{C}$ (14°F to 113°F) temperature range.
- Keep the camera away from very strong magnetic fields to avoid distortion and flutter on the screen.
- Do not hold the camera by the viewfinder.

Operation of the viewfinder

Do not point the viewfinder directly at the sun, or the plastic inside the viewfinder may be damaged.

Cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzene, which might damage the finish.

Repacking

Do not discard the carton. It affords maximum protection whenever the camera is transported. Do not transport or ship the camera only in the carrying case. Repack it as it was originally packed at the factory.

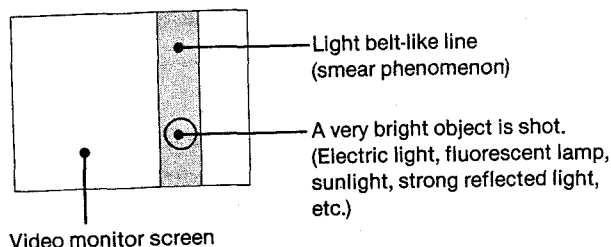
If you have any questions about this camera, contact your authorized Sony dealer.

Special Characteristics of a CCD

The following phenomena may appear on the monitor screen while the DXC-M7/M7P series video camera is used. These phenomena are not indicative of a camera malfunction.

Smear phenomenon

This may appear when a very bright object is shot.



White dots

White dots may appear on the screen when the camera is operated at high temperature.

Wavy picture

This may appear when fine stripes, straight lines, etc., are shot. Their images monitored on the screen look wavy.

Note

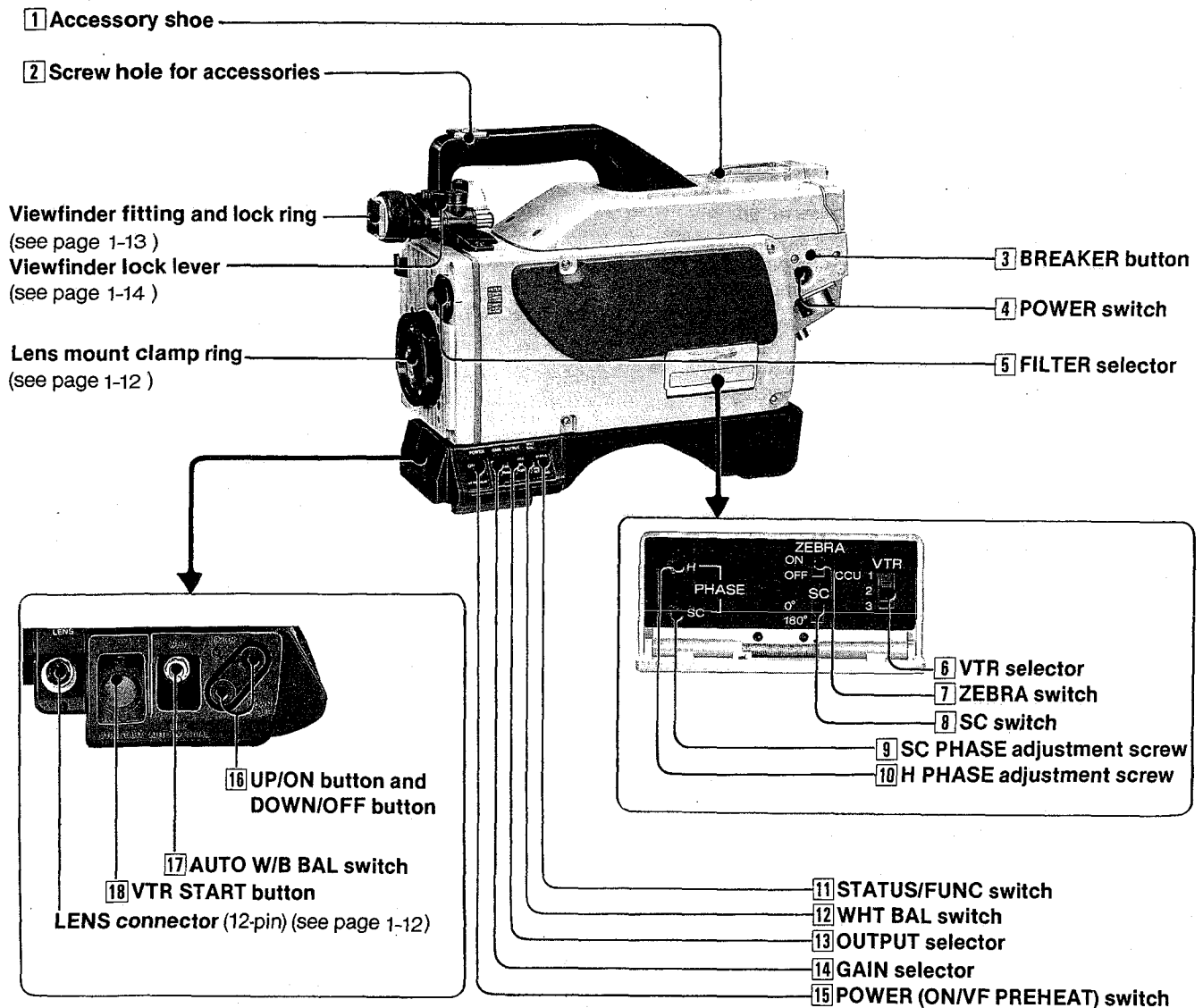
This instruction manual is for both the DXC-M7 series (DXC-M7/M7K/M7H) and the DXC-M7P series (DXC-M7P/M7PK/M7PH) color video cameras. These two types of cameras are designed for different signal systems, the NTSC and the PAL systems. So each type of camera must be used with the equipment which matches its signal system, but the operating procedures for both series are the same. The DXC-M7 series is for

the NTSC color system, and the DXC-M7P series is for the PAL system.

In this manual, usually, the DXC-M7P series camera and its connected equipment are referred to the PAL model by a suffix "P", "PS", or "CE" in their names. The DXC-M7 series camera and its equipment are referred to the NTSC model without suffixes. If a model cannot be distinguished by its name, this manual specifies whether it is an NTSC or PAL model.

Location and Function of Controls

DXC-M7/M7P Color Video Camera Head



1 Accessory shoe

Used to attach a DXF-40/40CE (4-inch) or DXF-50/50CE (5-inch) viewfinder (optional). For details, refer to the instruction manual furnished with the viewfinder.

2 Screw hole for accessories

U1/4"-20UNC. Use a screw with the length of max. 6 mm.

3 BREAKER button

When an excessive current flows from a power source, breaker is activated, and the power is automatically cut off. After removing the cause of an excessive current, press this button. The power will be restored.

4 POWER switch

Used to turn the power of the camera on and off.

5 FILTER selector (see page 1-31)

Used to select an appropriate filter according to the light sources illuminating the object.

6 VTR selector

Set to the appropriate position, according to the equipment (VTR, CCU) to be used.

For details, see pages 1-18~1-21, and 1-41~1-42.

1/CCU: For a VTR such as the Sony U-matic, 1-inch or "Betacam" format VTR, or a CCU-M7/M7P or CCU-M3/M3P camera control unit.

2: For a VHS format VTR such as a Panasonic NV-100.

3: For an S-VHS format VTR such as a Panasonic AG-7400.

7 ZEBRA switch (see page 1-30)

ON: A zebra pattern appears as a reference on the part of the viewfinder screen where the video level of the object is about 70 IRE. Use the pattern as reference to adjust the iris manually.

OFF: A zebra pattern does not appear.

8 SC (subcarrier) switch (see page 1-44)

Used to select the SC phase difference, 0° or 180°, between the gen-lock input and video output signals when two or more cameras are used simultaneously. This roughly adjusts the difference.

9 SC PHASE (subcarrier phase) adjustment screw (see page 1-44)

Used for fine adjustment of the SC phase difference between the gen-lock input and video output signals when two or more cameras are used simultaneously after roughly adjusting it with the SC switch **8**.

10 H PHASE (horizontal phase) adjustment screw (see page 1-44)

Used to adjust the horizontal phase difference between the gen-lock input and video output signals when two or more cameras are used simultaneously.

11 STATUS/FUNC switch (see pages 1-38 – 1-40)

Used to change the characters displayed on a viewfinder.

12 WHT BAL (white balance memory select) switch

A or B: When white balance is automatically adjusted using the AUTO W/B BAL switch **17** with this switch set to this position, the adjusted value is stored in the A or B memory. After adjustment, the stored white balance value can be used for shooting at any time.

RESET: The factory-preset white balance value (3200K for iodine lamps) will automatically be used, provided that the FILTER selector **5** is set to the 1 position. You can start shooting immediately.

13 OUTPUT selector

Used to select the video output signal from the VIDEO OUT and 26-pin connectors. The signal sent to a viewfinder screen is also selected.

CAM: The signal picked up by the video camera will be output. The Dynamic Contrast Control (DCC) circuit (see page 1-39) can be turned on and off.

BARS: The color bar signal will be output. Use the signal for adjusting the video monitor. The DCC circuit does not operate.

14 GAIN selector (see page 1-31)

Used to select the gain of the video amplifier according to the brightness of the object.

0 (dB): Normally set to the 0 position.

9 (dB): The gain will be increased by 9 dB

18 (dB): The gain will be increased by 18 dB

15 POWER (ON/VF PREHEAT) switch

After the POWER switch **4** is set to the ON position, set this switch as follows:

ON: The power of the camera is turned on.

VF PREHEAT: The power is supplied only to the viewfinder. In the standby mode, set the switch to the VF PREHEAT position, and to start shooting, set to the ON position. Then the power is saved in the standby mode.

16 UP/ON button and DOWN/OFF button

Used to set the following items together with the STATUS/FUNC switch **11**.

- On/off of low light indication
- On/off of inadequate color temperature conversion filter indication
- Reference level for automatic iris adjustment
- Master pedestal level
- Knee point
- Shutter speed

17 AUTO W/B BAL (automatic white balance/black balance adjustment) switch

WHT: For automatic white balance adjustment, push this switch to the WHT position.

The WHT BAL switch should be set to the A or B position.

BLK: For automatic black set and black balance adjustment, push this switch to the BLK position.

When click sound is heard by pushing this switch to the WHT or BLK position, release the switch.

18 VTR START button

Used to start and stop recording when a portable VTR is connected to the 26-pin connector. Pressing this button starts recording, and pressing again stops recording. (The VTR button on the lens has the same function.)

Location and Function of Controls

DXC-M7/M7P Color Video Camera Head

MIC IN connector (XLR 3-pin, female)
(see page 1-15)

1 VTR START/RETURN VIDEO
button

Battery pack compartment
(see page 1-23)

VF (viewfinder) connector (8-pin)
(see page 1-13)

Microphone holder (see page 1-15)

2 MIC POWER switch

3 MIC LEVEL selector

4 DC IN connector

5 VF VIDEO selector

6 INTERCOM jack

7 INTERCOM LEVEL control

8 EARPHONE jack

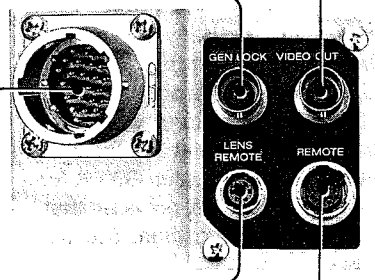
9 VIDEO OUT connector

10 GEN LOCK connector

11 26-pin connector

12 LENS REMOTE connector

13 REMOTE connector



1 VTR START/RETURN VIDEO button

When a portable VTR is connected to the 26-pin connector:

Used to start and stop recording. Pressing this button starts recording, and pressing again stops recording. (The VTR button on the lens has the same function.)

When a CCU-M7/M7P or CCU-M3/M3P is connected to the 26-pin connector:

The return video picture can be monitored on the viewfinder screen while the button is kept depressed. When the button is released, the camera picture can be monitored.

2 MIC POWER switch

ON: When a microphone of a phantom powering system is used, set the switch to this position. The power is supplied to the microphone from the MIC IN connector.

OFF: When a microphone other than a phantom powering system is used, be sure to set the switch to the OFF position.

3 MIC LEVEL (microphone output level) selector (see pages 1-18—1-21)

Used to select the output level of the signal picked up by the connected microphone. Set the switch to the -20 dB or -60 dB position according to the microphone input level of a VTR or CCU to be used.

4 DC IN connector (XLR 4-pin, male)

Used to connect the plug of the DC-8 battery adaptor to supply power to the camera from the battery packs.

5 VF VIDEO (viewfinder video) selector

Used to select the picture displayed on a viewfinder screen.

CAMERA: A camera picture is displayed during recording and playback.

AUTO: During recording, a camera picture is displayed, and during playback, a playback picture is displayed. On some VTRs, displayed picture cannot be changed automatically. For details, refer to the table on page 1-20.

VTR: A picture from the VTR is displayed during recording and playback. On some VTRs, a picture is not sent from the VTR during recording, and nothing is displayed on a viewfinder screen. For details, refer to the table on page 1-20.

6 INTERCOM jack (mini intercom jack)

Used to connect a DR-100 intercom headset (optional). It will be possible to communicate between the camera and the connected camera control unit or a video switcher.

7 INTERCOM LEVEL control

Used to control the audio output signal level from the INTERCOM jack **6**.

8 EARPHONE jack (minijack)

Used to connect an earphone for monitoring the recording or playback sound from the VTR.

9 VIDEO OUT connector (BNC type)

Used to connect a video input connector on a VTR or a video monitor.

10 GEN LOCK connector (BNC type)

Used to connect the gen-lock input signal (composite video signal or black burst signal) for operating the camera in an external sync mode.

11 26-pin connector

Used to connect all signals of the video camera such as video, audio, control signals, and also the power. Connect a VTR, CCU-M7/M7P or CCU-M3/M3P camera control unit, or CMA-8/8CE camera adaptor here.

12 LENS REMOTE connector (6-pin)

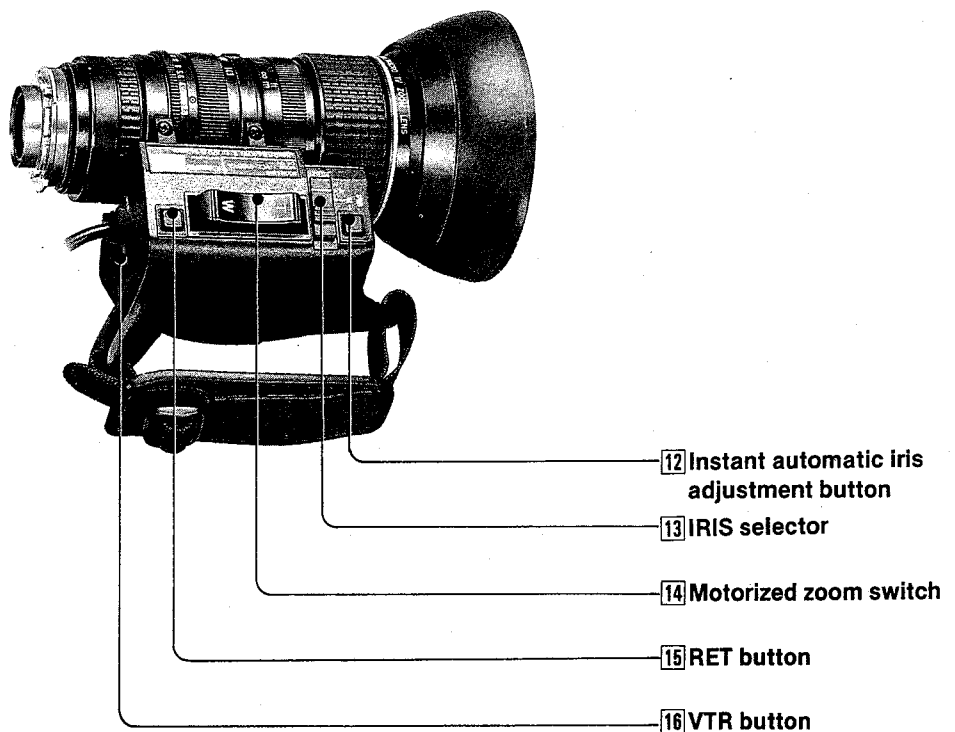
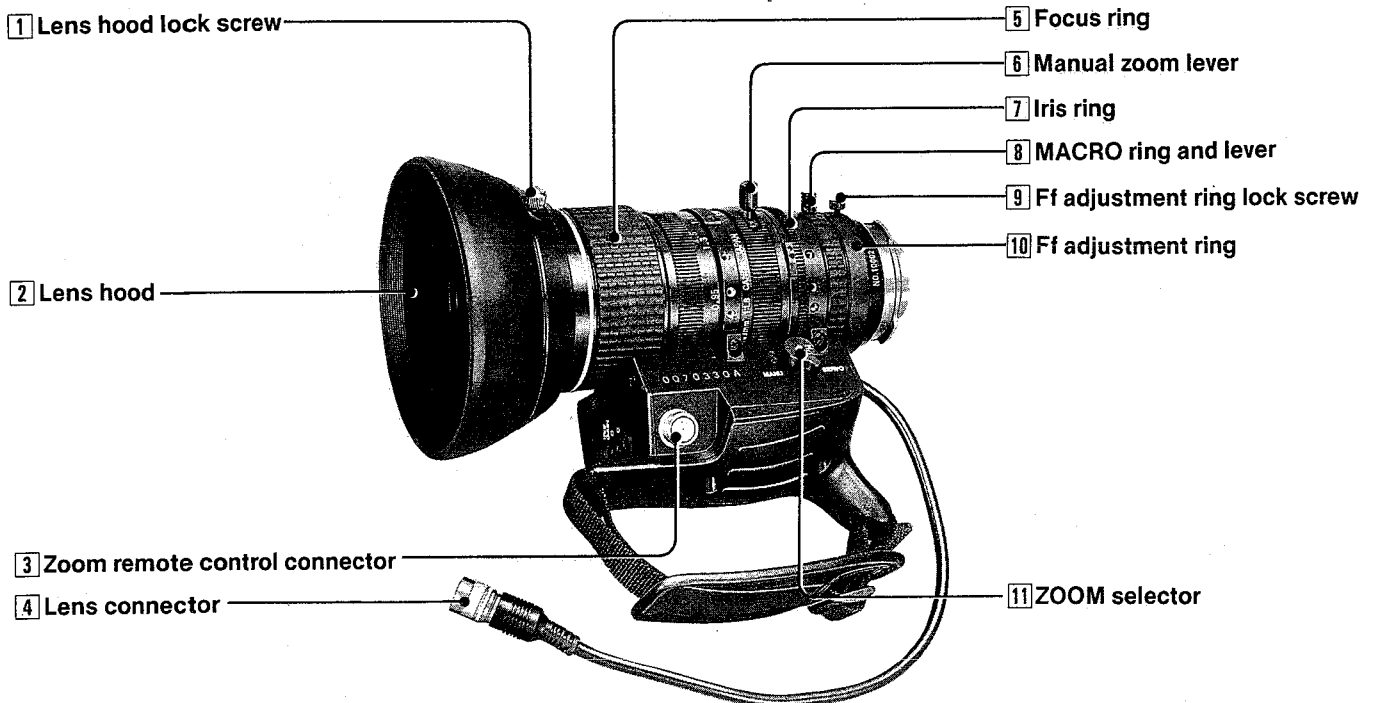
Used to connect a lens remote control unit (available in the near future).

13 REMOTE connector (10-pin)

Used to connect a remote control unit.

Location and Function of Controls

VCL-915BYA Zoom Lens



1 Lens hood lock screw**2 Lens hood****3 Zoom remote control connector (8-pin)**

Used to connect an LO-26 zoom remote control unit to remotely control a zoom function.
At the factory, a cap is attached here.

4 Lens connector (12-pin)**5 Focus ring**

Used to adjust focus. Turn the ring so that a clear picture is obtained.

6 Manual zoom lever

Used for manual zooming. Turn this lever with the ZOOM selector **11** set to the MANU position.

7 Iris ring

Used for manual iris adjustment. Turn this ring with the IRIS selector **13** set to the M position.

8 MACRO ring and lever

Used for close-ups. Pull the lever, and turn the ring to the direction indicated by the arrow.

9 Ff adjustment ring lock screw

Used to lock the Ff adjustment ring **10** at the adjusted position.

10 Ff (flange focal length) adjustment ring

Used to adjust the flange focal length.

11 ZOOM selector

SERVO: For motorized zooming.
MANU: For manual zooming.

12 Instant automatic iris adjustment button

Used to adjust iris automatically when the IRIS selector is set to the M position. While the button is pressed, the iris is automatically adjusted, and when released, the iris is adjusted manually.

13 IRIS selector

A (automatic): For automatic iris adjustment.
M (manual): For manual iris adjustment.

14 Motorized zoom switch

Used for motorized zooming with the ZOOM selector **11** set to the SERVO position. Press the W side for a wide-angle picture, and the T side for a telephoto picture. Zooming is faster when the switch is pressed down all the way and slower when the switch is pressed down only slightly.

15 RET (return video) button

Used to see a following picture on a viewfinder screen:

When a VTR is connected:

By pressing this button, a return video signal from a VTR (a picture in E-E mode, see page 1-20) can be seen.

When a CCU-M7/M7P or CCU-M3/M3P is connected:

By pressing this button, a return video signal from a switcher or a special effects generator can be seen.

16 VTR button

Used to start or stop recording when the DXC-M7/M7P is connected to a VTR. Pressing this button starts recording, and pressing it again stops recording.
This button has the same function as the VTR START button of the camera head.

Location and Function of Controls

DXF-M7/M7CE Viewfinder



1 REC/TALLY indicator (red)

When recording using one camera, this indicator illuminates during recording.

When two or more cameras are operated using CCU-M7/M7Ps or CCU-M3/M3Ps, this indicator illuminates when the camera's picture is selected by a switcher, etc. When a connected VTR is equipped with a warning system, the indicator blinks in accordance with the warning system of the VTR.

2 BATT indicator (red)

When the battery of the camera or VTR is discharged and the voltage becomes below the specified level, the indicator starts blinking.

When the camera continues to be operated after the indicator starts blinking, the indicator will lit, and then go out.

3 GAIN UP indicator (orange)

When the GAIN selector on the camera is set to the 0 (dB) position, the indicator is extinguished.

When the GAIN selector on the camera is set to the 9 (dB) or 18 (dB) position, the indicator lights up.

4 Eye cup

It is possible to see the screen with this part opened up.

5 Accessory receptacle

U1/4"-20UN. Screw length of max. 6 mm is acceptable.

6 TALLY switch

ON: The tally lamp **9** is activated.

OFF: The tally lamp **9** is deactivated.

7 CONTR (contrast) control

Used to adjust the contrast of the picture on the viewfinder screen.

This control does not affect the output signal of the camera.

8 BRIGHT (brightness) control

Used to adjust the brightness of the picture on the viewfinder screen.

This control does not affect the output signal of the camera.

9 Tally lamp (red)

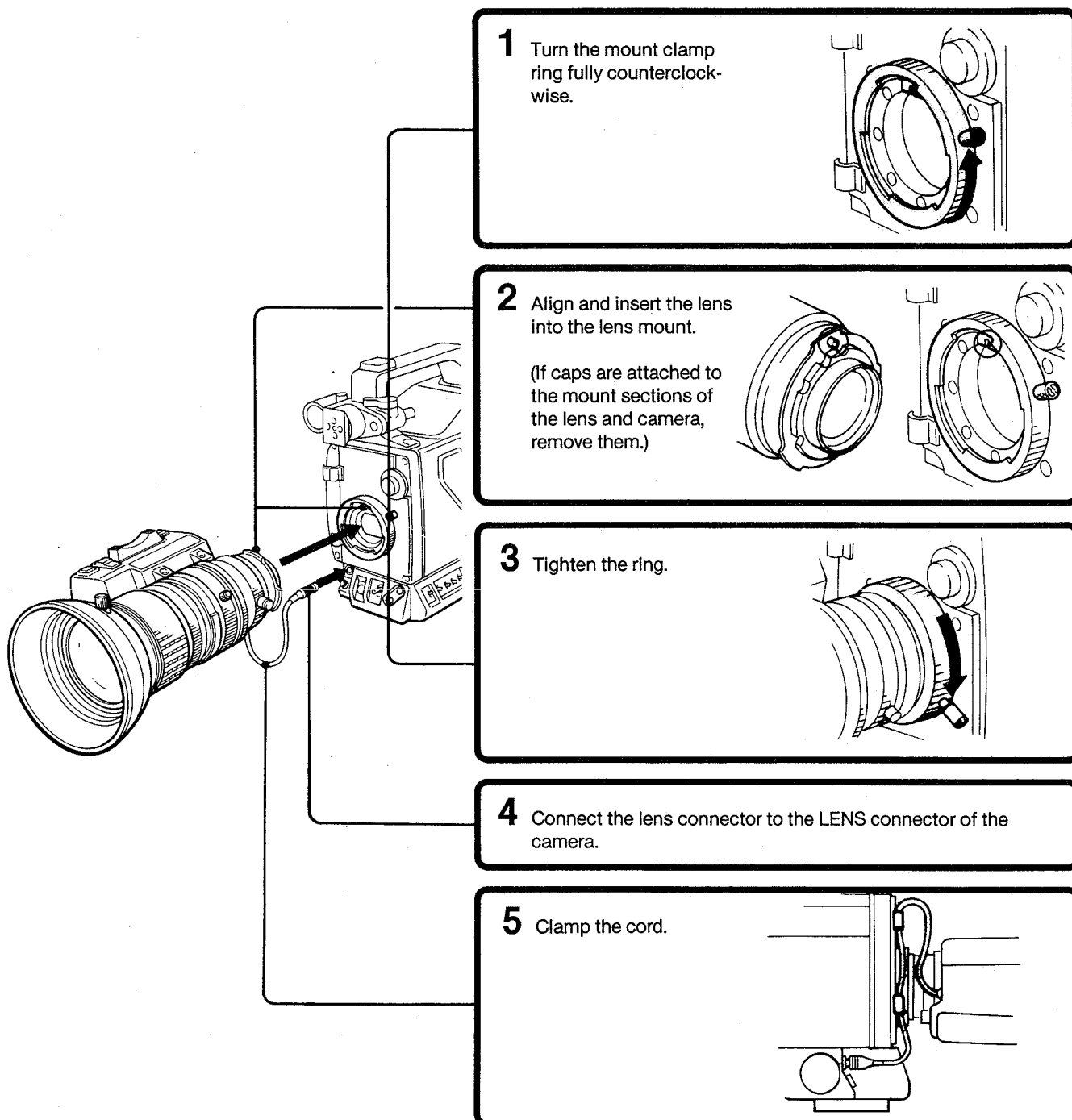
This lamp illuminates or blinks as same as the REC/TALLY indicator **1**.

10 Diopter adjustment ring (see page 1-26)

- On some VTRs, the REC/TALLY and BATT indicators do not illuminate nor blink. For details, refer to page 1-20.

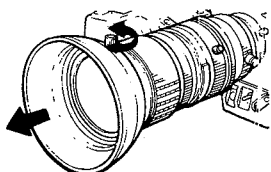
Attaching Accessories

Attaching a Lens

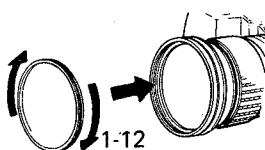


Attaching an optional filter to the lens

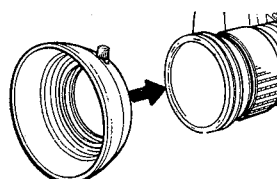
1 Loosen the lens hood lock screw, and detach the lens hood.



2 Screw the filter into the screw thread of the lens.

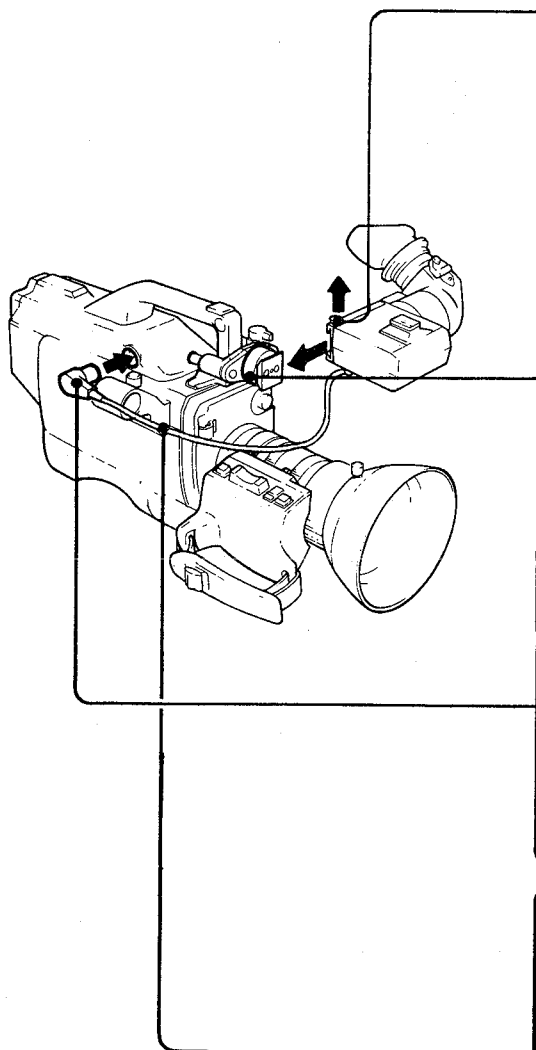


3 Replace the lens hood, and tighten the lens hood lock screw.

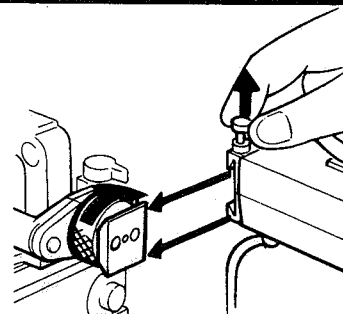


DXC-M7P (EK)
DXC-M7PM (BRZ)

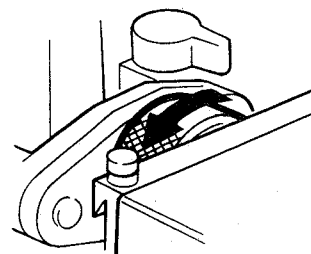
Attaching a Viewfinder



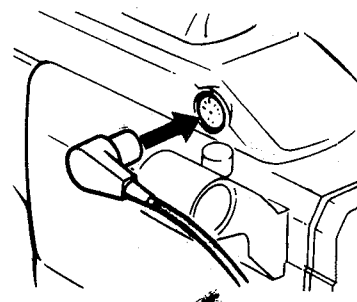
- 1** Loosen the lock ring, and align and slide the viewfinder into the mount while pulling the pin up.



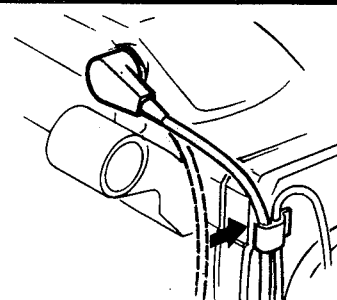
- 2** Tighten the lock ring.



- 3** Insert the connector to the VF connector of the camera.



- 4** Clamp the cord.



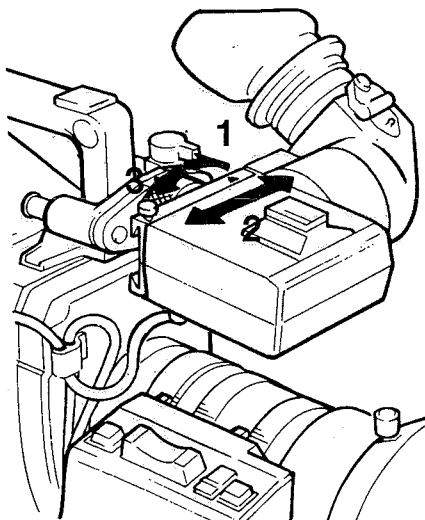
To detach the viewfinder

Loosen the lock ring, and slide the viewfinder while pulling the pin up.

Attaching Accessories

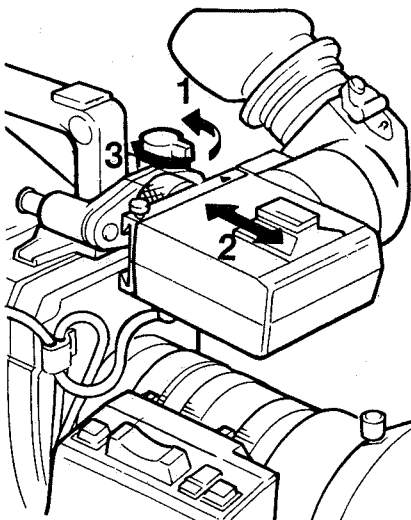
Adjusting the Viewfinder Position

Adjusting left and right position



- 1** Loosen the lock ring.
- 2** Slide the viewfinder left or right to place it to the desired position.
- 3** Tighten the lock ring.

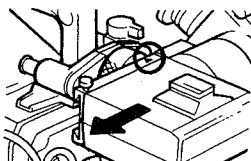
Adjusting back and forth position



- 1** Loosen the lock lever.
- 2** Slide the viewfinder back or forth to place it to the desired position.
- 3** Tighten the lock lever.

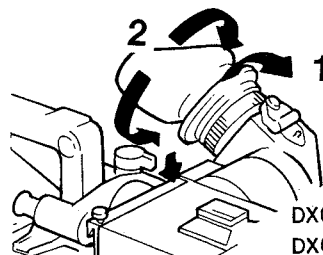
To insert the camera into the carrying case with the viewfinder attached

Slide the viewfinder to the "►" mark, and tighten the lock ring.



Adjusting the eye cup

- 1** Move the eye cup up or down for comfortable use.
- 2** Rotate the eye cup to fit the eye used for viewing.

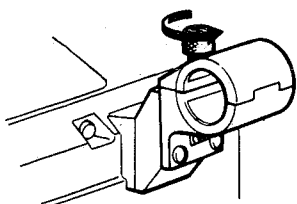


DXC-M7P (EK)
DXC-M7PM (BRZ)

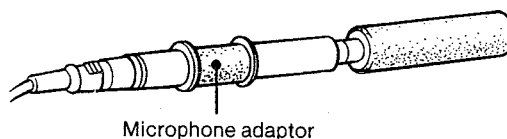
Attaching a Microphone

An optional Sony ECM-672, C-74 microphone or a thinner microphone can be attached to the camera.

- 1** Loosen the screw of the microphone holder.

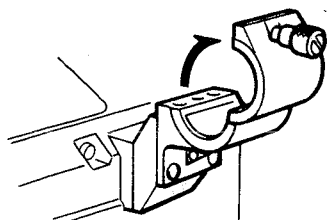


- 3** Attach a microphone adaptor to the microphone when a thin microphone is used.

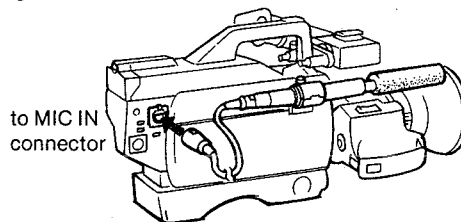


When the ECM-672 or C-74 is used, the microphone adaptor is not necessary.

- 2** Open the microphone holder.



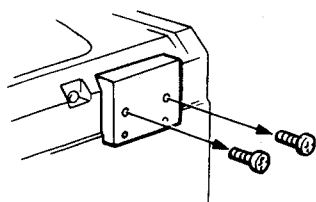
- 4** Insert the microphone to the microphone holder, and tighten the screw.



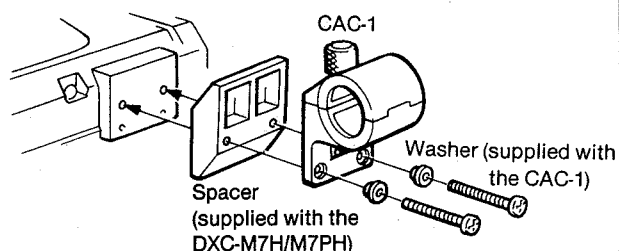
For the customers of the DXC-M7H/M7PH

The microphone holder is not supplied with the DXC-M7H/M7PH. Attach an optional CAC-1 camera microphone holder as shown below.

- 1** Remove blind screws.



- 2** Attach the CAC-1 and the spacers using the screws supplied with the DXC-M7H/M7PH.



Setting the MIC POWER switch

When a microphone of a phantom powering system such as Sony ECM-672, C-74, is used, set the MIC POWER switch to the ON position.

The power is supplied to the microphone from the camera. No independent power source is required to the microphone.

When a microphone other than a phantom powering system is used, be sure to set the MIC POWER switch to the OFF position.

Connecting an earphone

Connect an optional earphone to the EARPHONE connector. The sound picked up by the microphone can be monitored.

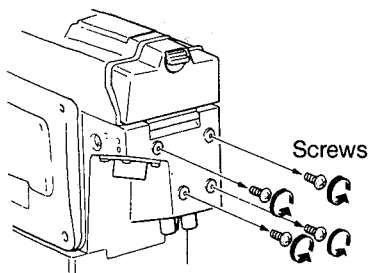
Attaching Accessories

Attaching a Battery Adaptor

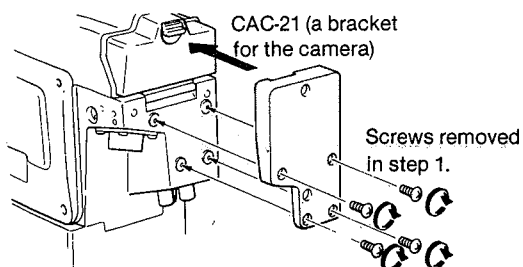
When you wish to use the camera for an extended period of time, attach a DC-8 battery adaptor (optional) to the camera by using a CAC-21 battery shoe (optional). In the DC-8, two NP-1A battery packs can be installed.

—Before attaching the DC-8, be sure to remove the NP-1A inserted into the battery compartment.

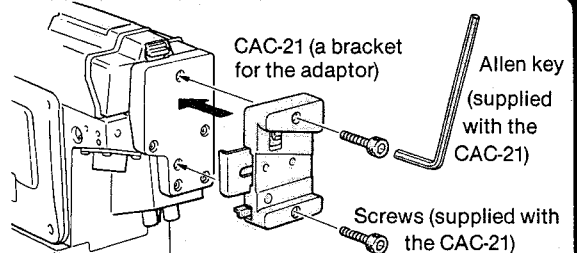
1



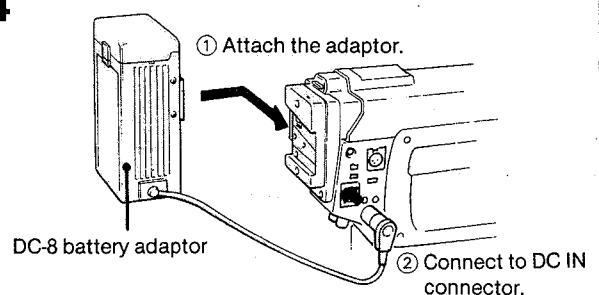
2



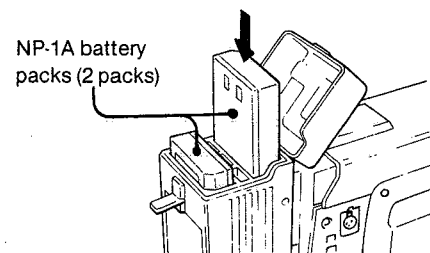
3



4

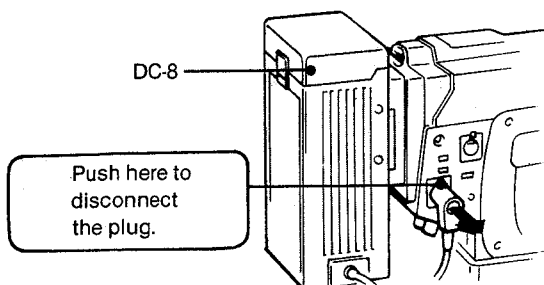


5

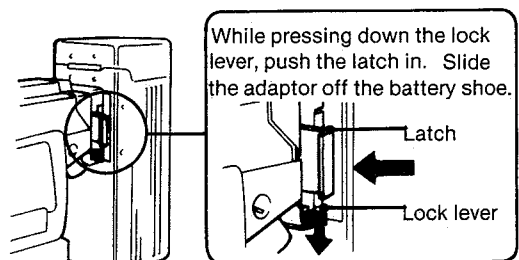


Removing the battery adaptor

1



2



Note on the NP-1A installed into the DC-8

When the DC-8 is attached, the camera can be operated with one or two NP-1A battery packs installed into the DC-8. When two NP-1As are used, be sure to fully charge both of them.

Do not use the charged and not-charged battery packs simultaneously.

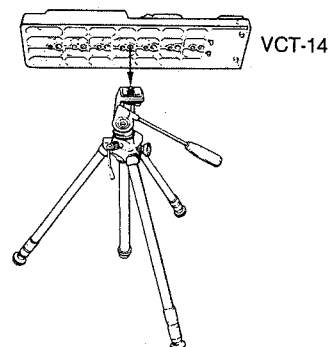
DXC-M7P (EK)
DXC-M7PM (BRZ)

Attaching to a Tripod

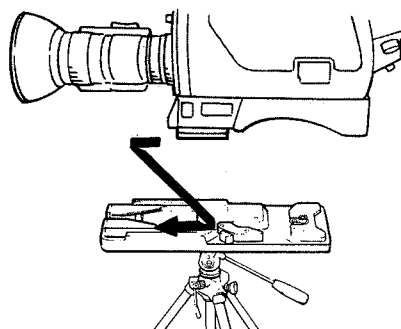
Attach the camera to the tripod using the VCT-14 tripod attachment.

- 1 Attach the tripod attachment to the tripod.
Attach the tripod to the position to be balanced.
Note that there are two sizes of screw holes in the tripod attachment. Be sure to use the hole which fits the screw of the tripod platform you are using.

The camera can be attached to the tripod directly using the screw hole on the bottom of the camera.

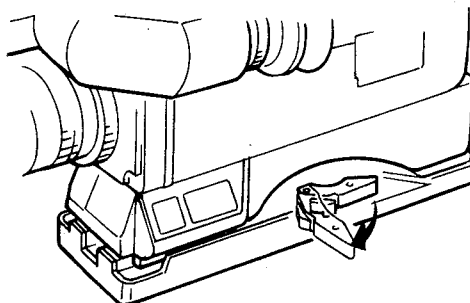


- 2 Attach the camera to the tripod attachment.
Slide the camera forward along the groove of the attachment until it clicks.



Detaching the video camera

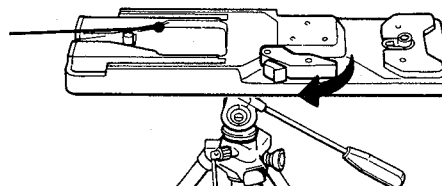
While pressing the red button, move the lever to the direction indicated by the arrow, and detach the video camera.



Note

When the video camera has been detached, the holding pin may still protrude from the center of the groove. If this happens, the video camera cannot be reattached to the tripod attachment. In order to move the holding pin back to its correct position, move the lever in the direction indicated by the arrow while pressing the red button.

Holding pin



Connecting the Video Camera to a VTR

According to the VTR to be connected, operating conditions such as the setting of the VTR selector, power supply, functions to be used, are different.

Connecting to a Portable VTR

VTRs to be connected:

Sony BVU-150/150P, VO-6800/6800PS, BVW-35/35P
Panasonic NV-100, AG-6400

To use the VTR other than those mentioned on the left, consult your authorized Sony dealer.

Power sources of the camera

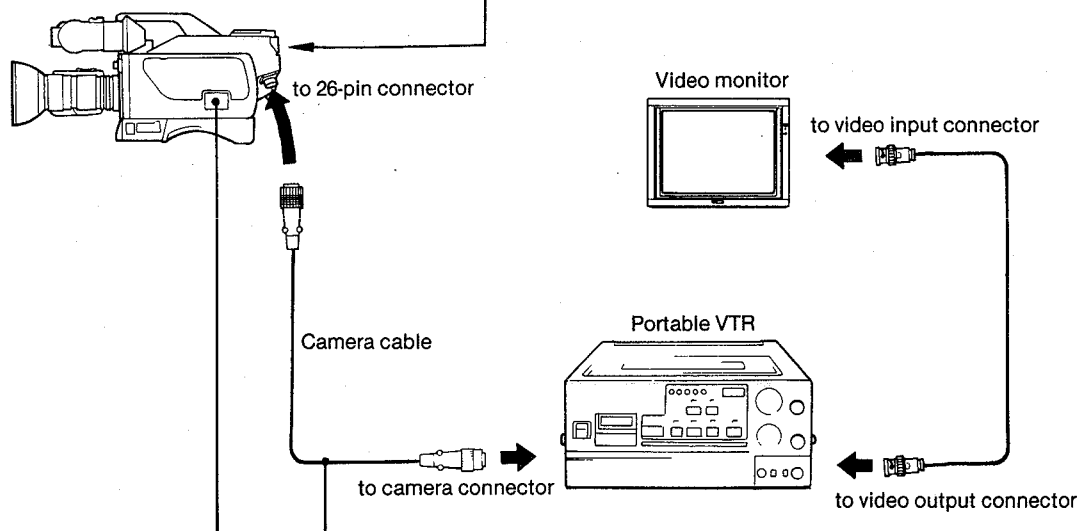
BVU-150/150P VO-6800/6800PS BVW-35/35P	Supplied from the VTR
NV-100 AG-6400	The camera must be powered independently.

MIC LEVEL selector

BVU-150/150P	-60 dB
VO-6800/6800PS BVW-35/35P	Set to the same position as the setting on the VTR.
NV-100 AG-6400	-20 dB

Note

When a VTR cannot supply the power to the camera, or the operating time is to be elongated, the camera must be powered independently. If the power is not supplied independently, a protection circuit in the VTR or the AC power adaptor may be activated, and the VTR may not operate.



VTR selector

BVU-150/150P VO-6800/6800PS BVW-35/35P	1
NV-100 AG-6400	2

Camera Cable

BVU-150/150P VO-6800/6800PS	CCZQ-A The camera cable can be extended up to 10 m (33 feet).
BVW-35/35P	CCZ-A The camera cable can be extended up to 10 m (33 feet).
NV-100 AG-6400	CCZJ The camera cable can be extended up to 5 m (17 feet).

Output signal of the 26-pin connector

If the VTR selector is set to the 1 or 2 position, two kinds of video signals, composite video and component video for "Betacam" format VTR (Y/R-Y/B-Y), are supplied from the 26-pin connector.

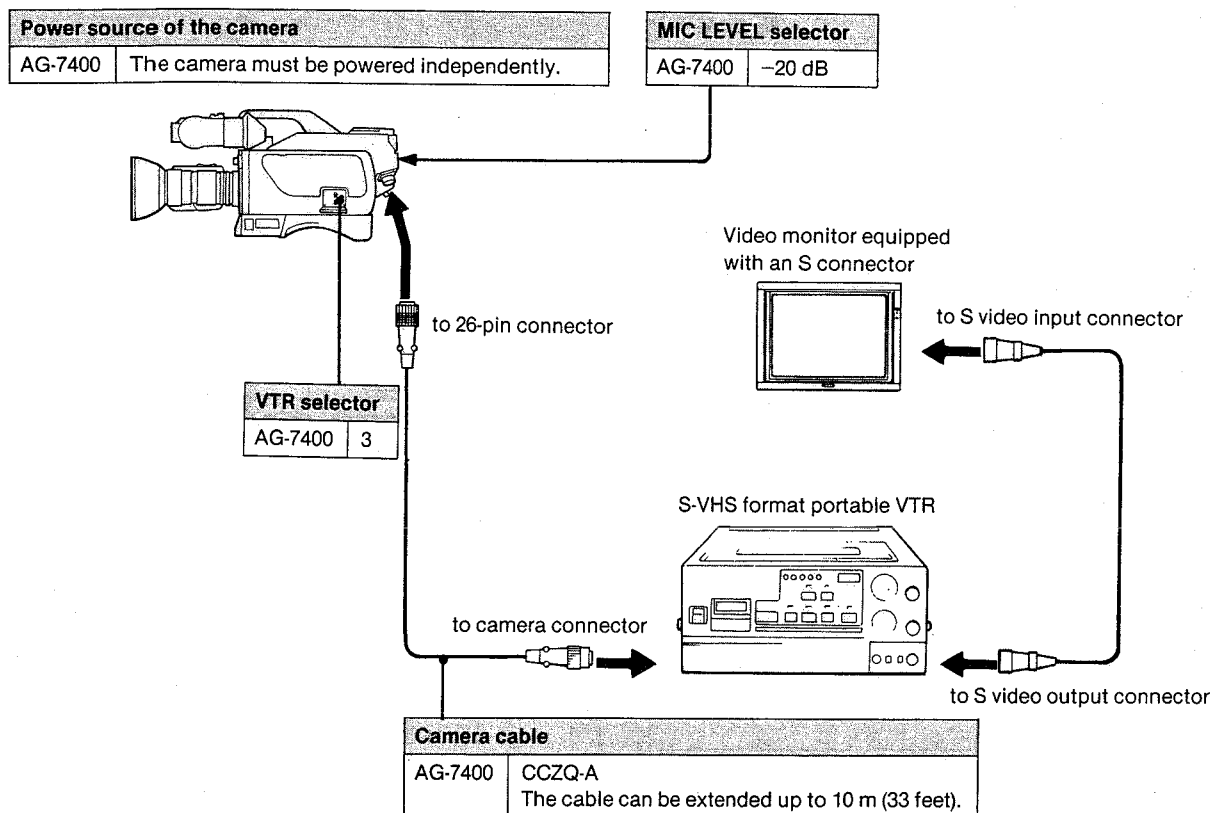
To supply the RGB signals

By setting a switch in the camera, the RGB signals or the Y/C signals can be supplied instead of the Y/R-Y/B-Y component signals. For details, consult your authorized Sony dealer.

Connecting to an S-VHS Format Portable VTR

For example, an AG-7400 (Panasonic, NTSC) is to be connected to the DXC-M7.

To connect a VTR other than the AG-7400, consult your authorized Sony dealer.



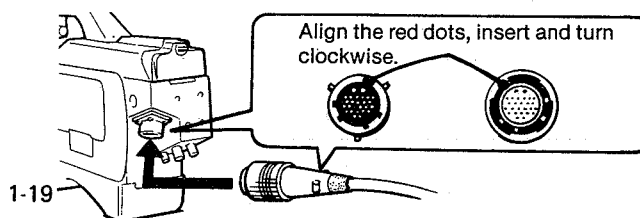
- When the VTR selector is set to the 3 position, the video signal output from the 26-pin connector is a Y/C signal.

Before making connections

Make sure that the power switches of the camera and other equipment are turned off.
If a large size viewfinder such as a DXF-50/50CE is connected with the POWER (ON/VF PREHEAT) switch on the camera set to the ON position, the camera may not operate normally.

DXC-M7P (EK)
DXC-M7PM (BRZ)

Connecting to the 26-pin connector



Connecting the Video Camera to a VTR

Operating Conditions and Functions of the Connected VTR

According to the VTR to be connected, the following functions are available.

Connected VTR	Remote control of VTR start/stop (from the camera or the lens)	Audio monitor (on the camera)	Viewfinder				
			REC indicator		BATT indicator	Picture shown on the viewfinder	
			REC indication	VTR alarm		During recording (picture picked up by the camera)	During playback (picture from the VTR)
BVU-150/150P	YES	YES	YES	YES	YES	YES	YES
VO-6800/6800PS	YES	YES	YES	YES	YES	YES	YES
BVW-35/35P	YES	YES	YES	YES	YES	YES	YES
NV-100	YES	NO	YES	NO	NO	YES	YES
AG-6400	YES	NO	YES	NO	NO	YES	YES
AG-7400	YES	YES	YES	NO	NO	YES	YES*

* A picture from a VTR can be seen only when the RET button is pressed.

To start recording

Press the VTR START/RETURN VIDEO or VTR START button of the camera or the VTR button of the lens.

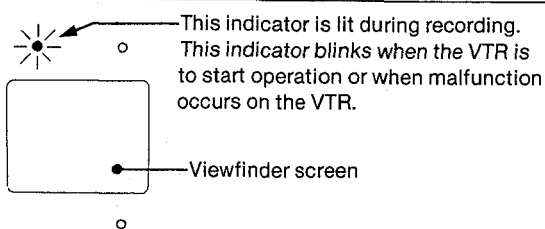
To stop recording

Press the VTR START/RETURN VIDEO button or VTR START button of the camera or the VTR button of the lens again.

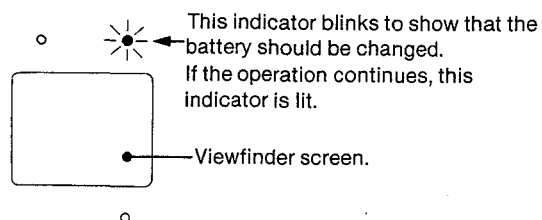
Monitoring the sound

Connect an earphone to the EARPHONE jack. The sound being recorded or played back can be monitored.

REC indicator (REC/TALLY)



BATT indicator

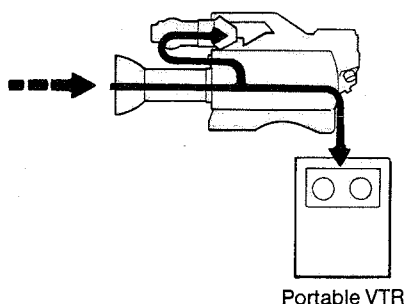


E-E (Electric-to-Electric) mode

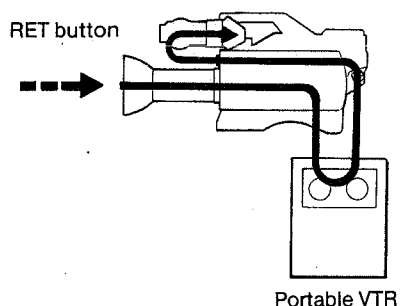
The input video signal to the VTR passes through the amplifier in the VTR and output from the video output connector without passing the video recording head and tape. The input signal to the VTR can be checked in this mode.

Monitoring the picture on a viewfinder screen

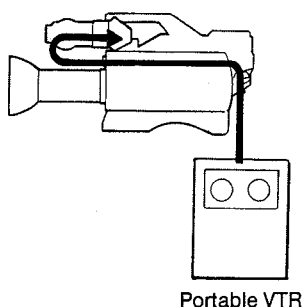
During recording: Picture picked up by the camera



While the RET button of the lens is pressed, the E-E mode picture (return video) from the VTR can be monitored.



During playback: Playback picture from the VTR

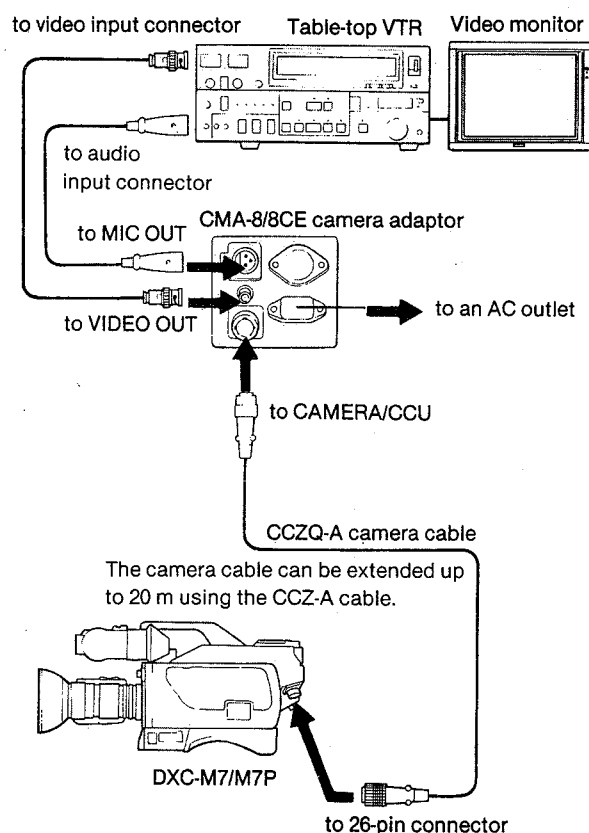


- While the playback picture from the VTR is displayed on the viewfinder screen, the camera's video signal, may be mixed with the playback picture.

Connecting to a Table-top VTR

For example, a Sony VO-9600/9600P is to be connected.

To connect a VTR other than the VO-9600/9600P, consult your authorized Sony dealer.



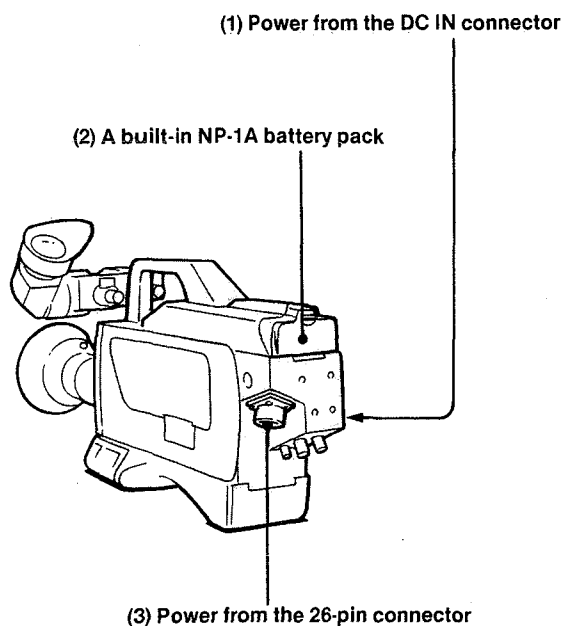
Set the VTR selector to the 1 or 2 position.
Set the MIC LEVEL selector to the appropriate position according to the audio input level of the VTR.

The operating procedure is different from that of a portable VTR as follows:

- The VTR START/RETURN VIDEO and VTR START buttons on the camera, and the VTR button on the lens do not function. Recording must be started and stopped with the function buttons on the VTR.
- The REC/TALLY indicator in the viewfinder does not function.
- The return video and the playback picture cannot be monitored on the viewfinder screen.

Power Sources

The DXC-M7/M7P operates on any of the following three types of power sources.



When two or three of the power sources (1) to (3) are simultaneously connected to the camera, only one of them is used according to numerical order priority. The other power source(s) is (are) automatically cut off.

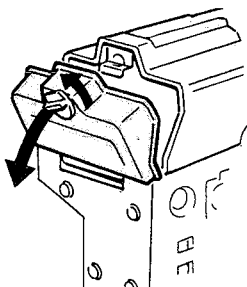
(1) Power from the DC IN Connector

The power is supplied from the DC-8 battery adaptor (optional). Two NP-1A battery packs (optional) can be installed in the DC-8. When two packs are installed, the camera and the DXF-M7/M7CE viewfinder can be continuously operated for about 140 minutes. For attaching the DC-8 to the camera, see page 1-16.

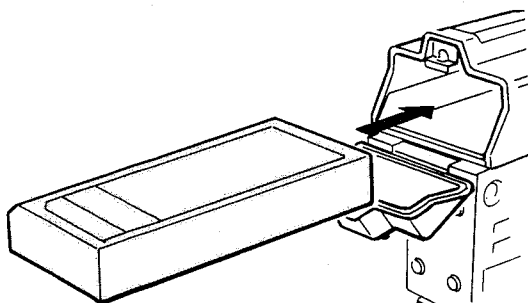
(2) A built-in NP-1A Battery Pack

Install an NP-1A battery pack (optional) in the battery compartment of the camera.

- 1 Turn the knob fully counterclockwise, and open the lid.



- 2 Insert the NP-1A, and close the lid.

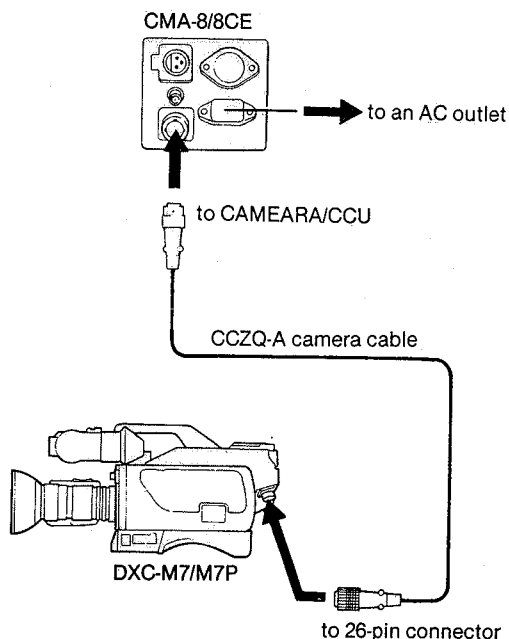


The camera and the DXF-M7 viewfinder can be continuously operated for about 70 minutes.

(3) Power from the 26-pin Connector

When a VTR, a camera control unit, etc. is connected to the 26-pin connector, the power is supplied from the connected equipment to the camera. Be sure to check that the VTR can supply the power to the camera in advance. For details, see pages 1-18~1-19.

Connecting the camera to the CMA-8/8CE camera adaptor



The power is supplied from the CMA-8/8CE to the camera, and the composite video signal and audio signal are supplied from the camera to the CMA-8/8CE.

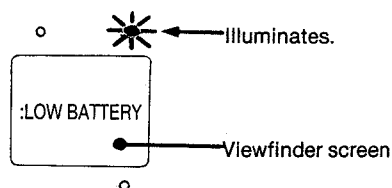
To connect the camera to the camera control unit, refer to "Studio Use".

Battery charging

Recharge the NP-1A battery pack before each use, using the BC-1WA battery charger. It takes about 60 minutes at the normal temperature. For details on recharging, refer to the battery charger's instruction manual.

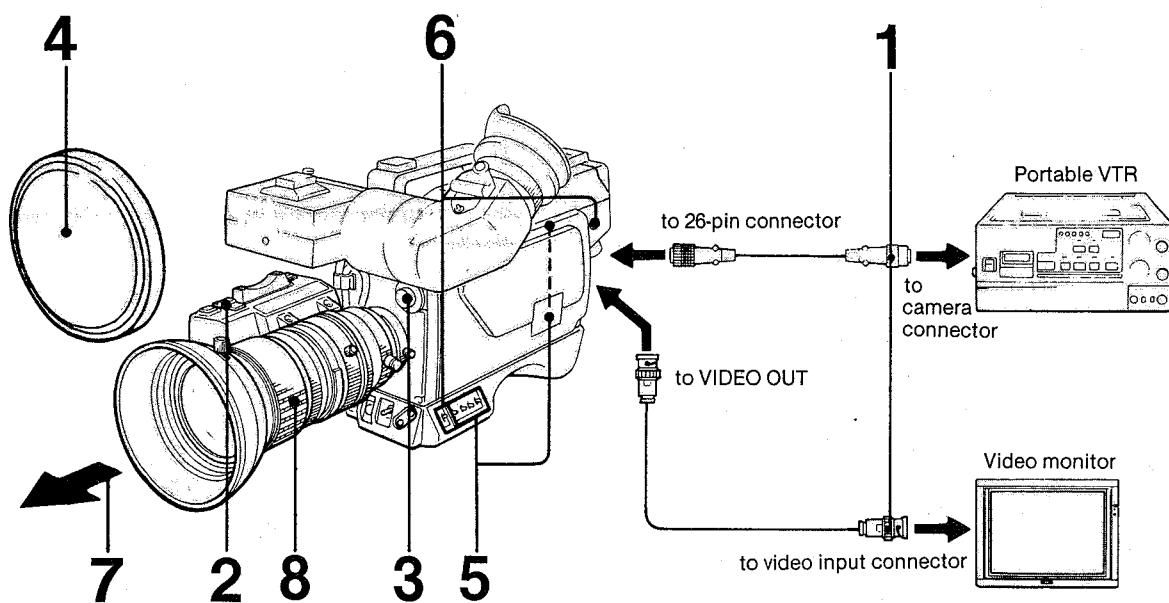
DXC-M7P (EK)
DXC-M7PM (BRZ)

BATT indicator



Basic Operation

It is recommended to be accustomed to the camera operation before actual camera recording.



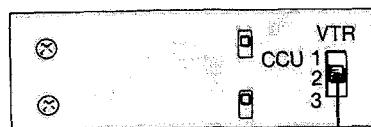
1 Connect a portable VTR and a monitor to the camera.

2 Set the IRIS selector to the A position.

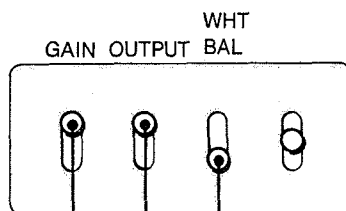
3 Set the FILTER selector to the 1 position.

4 Remove the lens cap.

5 Set the switches as follows:

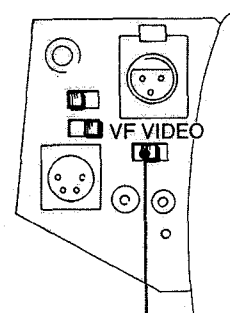


Set to the appropriate position according to the VTR to be connected.
(See pages 1-18—1-19.)



O (dB) CAM PRESET
DCC: ON

Side panel at the rear of the camera



AUTO

When a microphone is used, set the MIC POWER switch and MIC LEVEL selector appropriately. (See page 1-15.)

6 Turn the power of the connected equipment on.

The camera has two power switches, POWER switch and POWER ON/VF PREHEAT switch.
Be sure to set the both switches to the ON position.
A picture appears on the monitor and viewfinder screen.

7 Point the camera to the object which is more than 1 m apart from the lens.

8 Turn the focus ring to adjust the focus while viewing the picture on the monitor or viewfinder screen.

This is the fundamental procedure for camera operation.
To fully activate the functions and characteristics of the camera, the adjustments mentioned on the following pages are recommended.

Advanced Operation

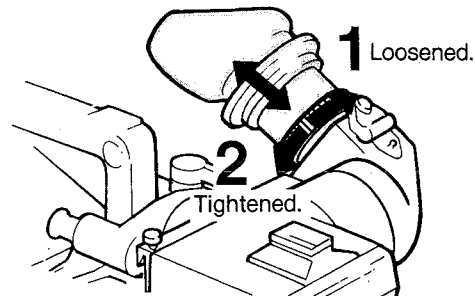
Adjusting a Viewfinder

Diopter adjustment

Since each operator's eyesight varies, it is necessary to adjust the diopter each time the viewfinder is used by a new operator.

Adjust the diopter after focusing as follows.

- 1 Loosen the diopter adjustment ring.
- 2 Slide this part back and forth so that the image can be monitored clearly. Tighten the ring.

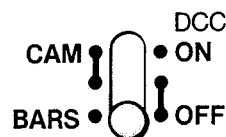
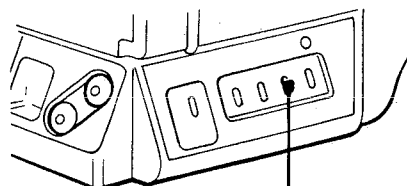


Adjusting the contrast and brightness of the viewfinder

Using the color bar signals generated by the DXC-M7, the contrast and brightness can be adjusted.

- 1 Set the OUTPUT selector to the BARS position.
- 2 Adjust the contrast and brightness with the CONTR and BRIGHT controls, referring to the color bar signal on the viewfinder screen.

The CONTR and BRIGHT controls do not affect the output signals of the camera.
- 3 Set the OUTPUT selector to the CAM position after adjustment.



Note on diopter adjustment

The adjustable range of the diopter is from $-1D$ to $-3D$.

Note

When the OUTPUT selector is set to the BARS position, the iris automatically closes. If the IRIS selector is set to the M position, the iris does not open even if the OUTPUT selector is returned to the CAM position. It is necessary to open the iris manually.

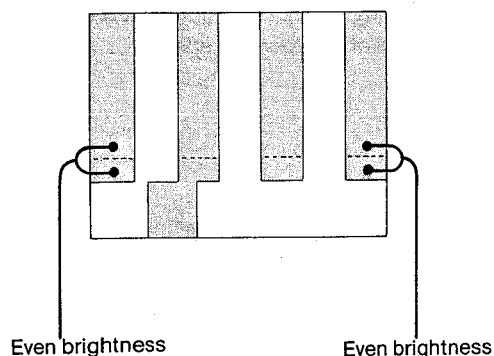
Adjusting a Video Monitor (for the DXC-M7 only)

Using the SMPTE color bar signal generated by the DXC-M7, the monitor can be adjusted.

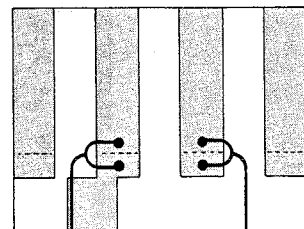
- 1** Set the OUTPUT selector on the camera to the BARS position.

- 2** Set the monitor to monicolor mode of blue (B).

- 3** Turn the chroma control on the monitor until the following conditions are obtained.



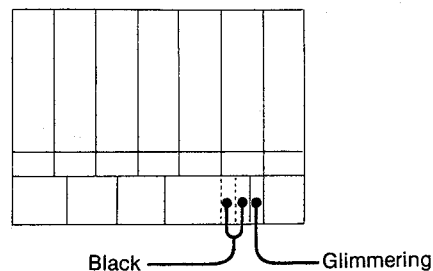
- 4** Turn the phase control on the monitor until the following conditions are obtained.



Repeat steps 3 and 4 until the brightness of 4 blue parts will be even.

- 5** Set the monitor to the normal (tricolor) mode.

- 6** Turn the brightness control on the monitor until the following conditions are obtained.



(Adjustment in step 6 is required every time the brightness around the monitor or the distance between the operator and the monitor is changed.)

- 7** Set the OUTPUT selector on the camera to the CAM position.

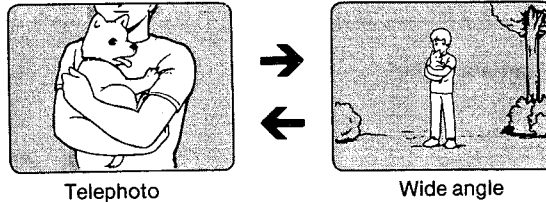
Note

When the OUTPUT selector is set to the BARS position, the iris automatically closes. If the IRIS selector is set to the M position, the iris does not open even if the OUTPUT selector is returned to the CAM position. It is necessary to open the iris manually.

Advanced Operation

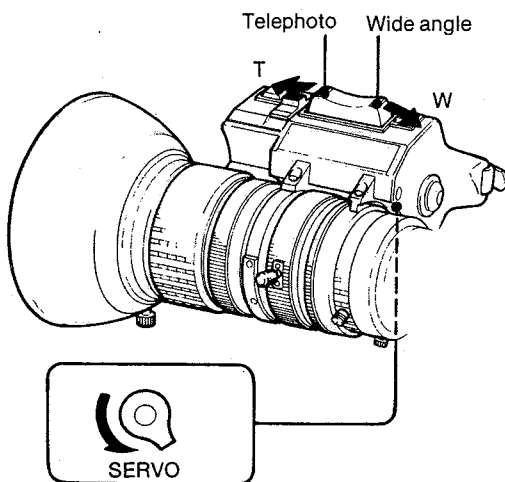
Zooming

A picture angle can be changed consecutively.



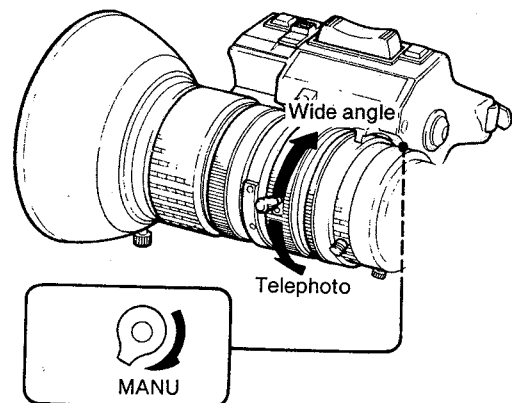
Motorized zoom

Set the ZOOM selector to the SERVO position, and press the zoom switch. Then you can zoom smoothly. Zooming is faster when the switch is pressed down all the way and becomes slower when it is pressed down only slightly.



Manual zooming

Set the ZOOM selector to the MANU position for manual zooming. Manual zooming allows more precise control of the zooming speed.



Tips on zooming

Correct focusing

If the focus is right in the telephoto position, it will be right when you zoom out to wide angle.

Positioning the object at the center of the screen

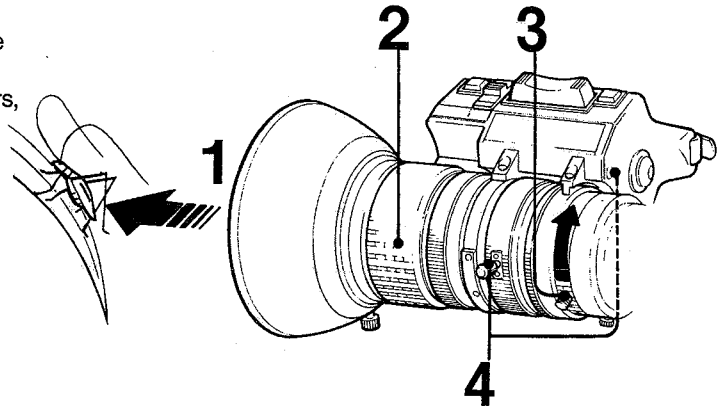
For zoom in operation, adjust the focus in the telephoto position, and set to the wide angle position. Then start zoom in operation. Otherwise the subject may be out of the screen during zooming in.

Following

Zoom up on the object and follow its movement with the camera. This zoom effect is used, for example, to emphasize the speed of the object by making the background rush past in a blur.

Close-ups

To shoot small or nearby objects within 1 m from the camera, the close-up or macro function is recommended. This function lets you zoom in flowers, insects and even photographs.



1 Adjust the distance between the lens and the object to get the desired image size.
The minimum distance from the lens to the object is 10 mm in the "9.5" wide-angle zoom position.

2 Set the focus ring to the ∞ position.

3 Pull and turn the MACRO ring lever to the direction indicated by the arrow until it stops.

4 Set the ZOOM selector to the MANU position, and turn the zoom lever to adjust the focus.

The focus can be adjusted on the object at the infinity or at the middle point.

When the close-ups operation is completed, turn the MACRO ring to the opposite direction indicated by the arrow until it stops.

To reduce the object's size on the screen

First adjust the focus following steps 1 through 4 above, then turn the MACRO ring slightly to the opposite direction indicated by the arrow, and adjust the focus with the zoom lever again.

Note

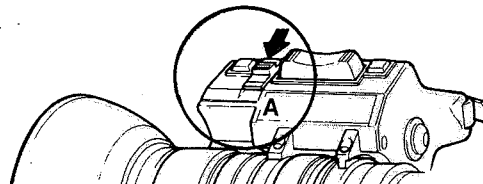
The depth of field is short in the close-ups shooting. Adjust the diopter and focus precisely.

Advanced Operation

Adjusting the Iris

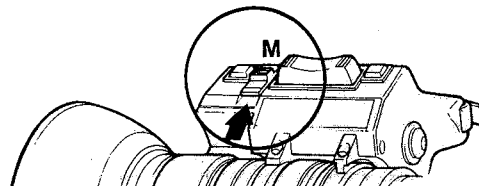
Automatic adjustment

Set the IRIS selector to the A position, and the iris will be automatically adjusted to the brightness of the object. Normally use the A position.



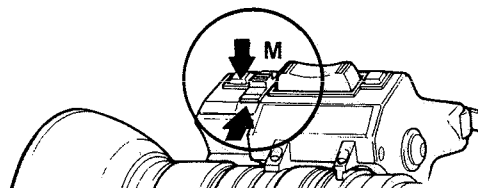
Manual adjustment

Set the IRIS selector to the M position, and turn the iris ring. Manual adjustment may be effective when shooting an object against a bright sky or scene with high contrast.



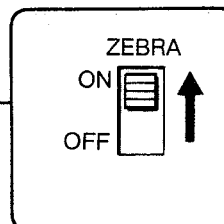
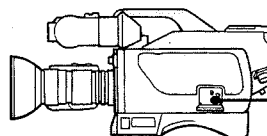
Temporary automatic adjustment

While the momentary automatic iris adjustment button is kept depressed during manual iris adjustment, the iris is automatically adjusted. When the button is released, the iris will be fixed at the value that has just been obtained until the iris is adjusted again manually.



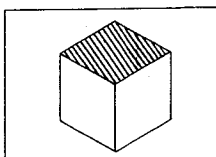
Zebra pattern—Reference for manual iris adjustment

Set the ZEBRA switch to the ON position, and the zebra pattern appears on the part of the viewfinder screen whose video level is about 70 IRE. Adjust the iris so that the zebra pattern appears on the main part of the picture, for example, on the face of a person against a bright background.

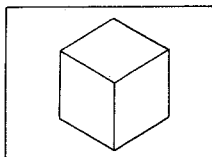


Zebra pattern

ZEBRA switch → ON



→ OFF



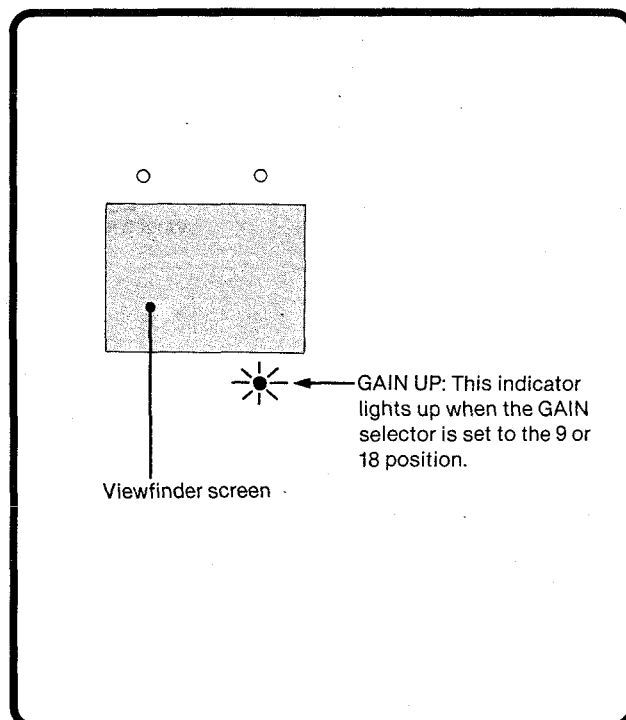
Selecting an Optical Filter

Select an appropriate filter with the FILTER selector in accordance with the lighting conditions to obtain the correct hue.

Filter number	Color temperature and ND	Lighting conditions
1	3200K	Sunrise, sunset, iodine lamp
2	5600K+1/4ND	Bright outdoor
3	5600K	Cloudy, rainy
4	5600K+1/16ND	Clear and brilliant air in a place such as a snowscape, high mountain, seaside, etc.

Selecting the Gain of the Video Circuit

If a clear picture cannot be obtained because of insufficient lighting, set the GAIN selector to the appropriate position. The video gain can be increased by 9 dB by setting the selector to the 9 position, and by 18 dB by setting the selector to the 18 position. Normally set the GAIN selector to the 0 position.



ND (Neutral Density) filter

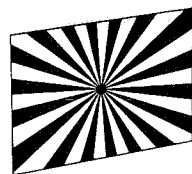
The ND filter evenly absorbs all wavelength of lights, which reduces the amount of light input to the camera without changing the color.

Advanced Operation

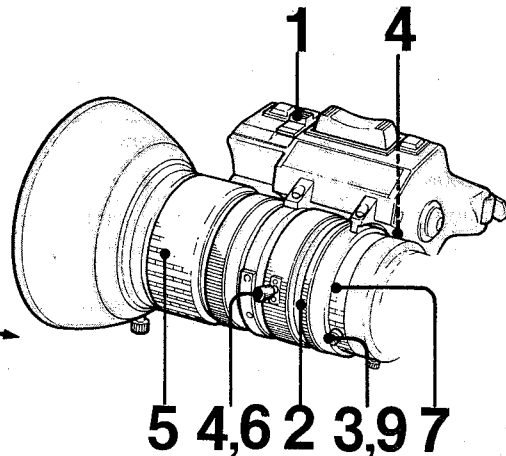
Adjusting the Flange Focal (Ff) Length

The proper flange focal length adjustment insures that the object is in focus both at the wide-angle position and at the telephoto position when zooming.

The flange focal length adjustment is required only when the lens is changed.



about 3 m



1 Set the IRIS selector to the M position.

2 Open the iris (set the iris ring to the 1.8 position). Place the flange focal length adjustment chart at the position about 3 m apart from the lens, and illuminate it so that the proper video level is obtained with the iris ring set to the 1.8 position.

3 Loosen the Ff adjustment ring lock screw.

4 Set the ZOOM selector to the MANU position, and turn the manual zoom lever to the telephoto position, 143.

5 Point the camera to the flange focal length adjustment chart, and adjust the focus with the focus ring.

6 Turn the manual zoom lever to the wide angle position, 9.5.

7 Turn the Ff adjustment ring to adjust the focus on the chart. Do not move the focus ring.

8 Repeat steps 4 through 7 until the focus is adjusted at both telephoto and wide angle positions.

9 Tighten the Ff adjustment ring lock screw.

Adjusting the Black Balance and Black Set

The black balance adjustment is required in order to obtain picture clarity and lifelike color reproduction. The deviation of black level among the R, G and B channels (black set) should also be adjusted.

When the automatic black balance adjustment is executed, the black set is adjusted first, and the black balance is then adjusted.

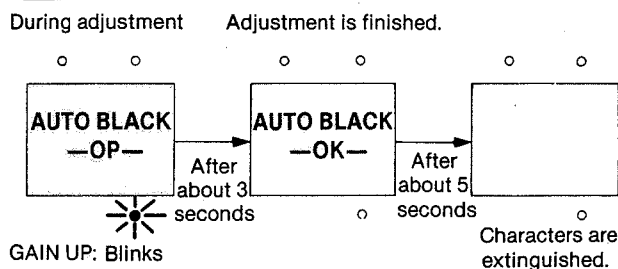
The adjusted value is kept in the memory of the camera for more than 10 years.

Adjustment

Push the AUTO W/B BAL switch to the BLK position. When the click sound is heard, release the switch. The adjustment starts, and finishes after about three seconds. The adjusted value is automatically stored in the memory.

The black balance and black set adjustments do not depend upon the lighting conditions.

Character display on the viewfinder screen



If the black balance cannot be adjusted

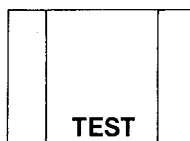
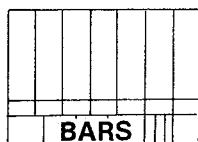
The characters shown on the right are displayed on the viewfinder screen.

The iris is not closed during adjustment of the black balance. This may occur when the lens connector is not connected correctly, or when some trouble occurs on the lens.

**AUTO BLACK
—NG—
IRIS:
NOT CLOSED
TRY AGAIN**

When the video camera outputs the color bar signal or test saw signal

The automatic black balance cannot be adjusted. The following characters are displayed on the viewfinder screen. Set the camera so that the normal video signal is output, and readjust it.



Note

When the black balance is adjusted, the iris automatically closes. If the IRIS selector is set to the M position, the iris does not open even if the black balance adjustment is finished. It is necessary to open the iris manually.

Advanced Operation

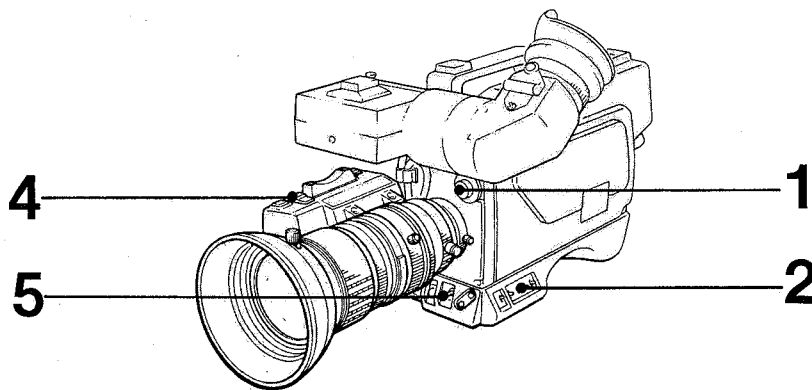
Adjusting the White Balance

The white balance should be adjusted so that the white object is reproduced as white and lifelike color is obtained.

The white balance changes according to the lighting conditions.

Adjust the balance under the same lighting conditions as those to shoot the object.

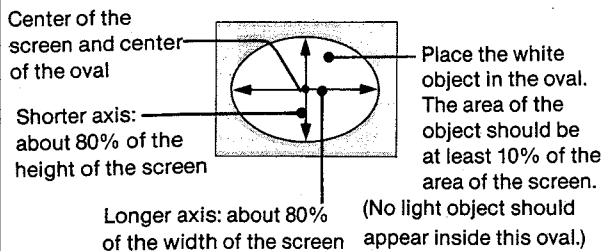
When the lighting condition is changed, readjustment is required.



1 Select an appropriate filter with the FILTER selector in accordance with the lighting conditions.

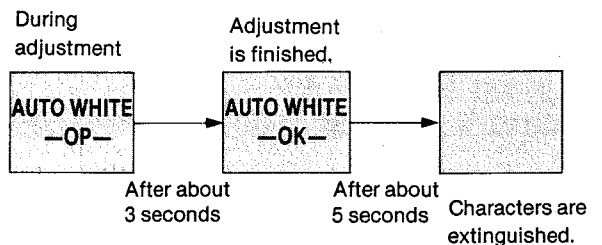
2 Set the WHT BAL switch to the A or B position.

3 Zoom up on a white object such as a white cloth or white paper with the same lighting conditions as those under which the recording will be made. The minimum white area required for adjustment is as follows.



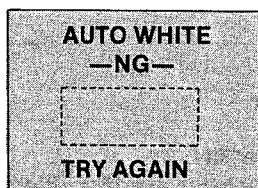
4 Set the IRIS selector of the lens to the A position.

5 Push the AUTO W/B BAL switch to the WHT position. When the click sound is heard, release the switch. The adjustment starts, and finishes after about three seconds. The adjusted value is automatically stored in the A or B memory (selected by the WHT BAL switch).



If the white balance cannot be adjusted

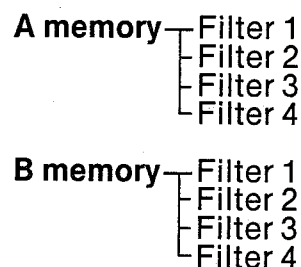
The following characters are displayed on the viewfinder screen.
Readjust the white balance after the required measures.



Display	Causes and measures
:LOW LIGHT	Light is insufficient. Add illumination or raise the video output level with the GAIN selector.
: ??	The object is not white or very bright light appears in the picture. Change the object to an appropriate one.
:C. TEMP. LOW CHG. FILTER	Color temperature is too low. Select an appropriate filter with the FILTER selector.
:C. TEMP. HI CHG. FILTER	Color temperature is too high. Select an appropriate filter with the FILTER selector.

Memorizing the white balance value

The DXC-M7/M7P has memories to store the adjusted values of white balance. It has two sets of memories, A and B, and in each memory the values adjusted at each filter position, 1, 2, 3 and 4 are stored. Therefore 8 kinds of values can be stored in total, 4 for A memory and 4 for B memory.



The stored values are kept for more than 10 years even if the power is off unless otherwise the newly adjusted value is stored.

If you want to start recording without the delay caused by the need to adjust the white balance

Set the FILTER selector to the 1 position for indoor shooting, or to the 2 position for outdoor shooting, and set the WHT BAL switch to the PRESET position. The approximate white balance can be obtained.

If the automatic white balance adjustment cannot be made

In the following four cases, the white balance cannot be adjusted automatically even if the AUTO W/B BAL switch pushed to the WHT position. On the viewfinder screen, the following characters will be displayed.

When the WHT BAL switch is set to the PRESET position	WHITE: PRESET
When the CCU is connected, and the manual white balance adjustment is selected on the CCU.	WHITE: MANUAL
When the color bar signal is output	BARS
When the test saw signal is output	TEST

Warning Indications and Character Display

Warning Indications

The following warnings are displayed on the viewfinder screen when the shooting conditions are not satisfied.

:LOW LIGHT	Meaning	The lighting is insufficient.
	Measures	Increase the lighting. Open the iris. Select an appropriate filter. Set the GAIN selector to the 9 or 18 position.

This indication can be inhibited to appear even under insufficient lighting conditions. For details, see page 1-38.

:C.TEMP.HI or :C.TEMP.LOW	Meaning	The color temperature is too high (or low).
	Measures	Adjust the white balance again. Select an appropriate filter.

This indication can be inhibited to appear even if the color temperature is inappropriate. For details, see page 1-38.

:LOW BATTERY	Meaning	The input voltage to the camera is less than about 11.2 V.
	Measures	Replace the battery with a fully charged one. When you continue recording with a weak battery and the input voltage is less than 11.0 V, the BATT indicator in the viewfinder lights up. The quality of the recording will deteriorate.

Note on color temperature warning indication

Even if the white balance has been correctly adjusted : C. TEMP. HI or LOW may appear when blue or red object is displayed on the whole screen.

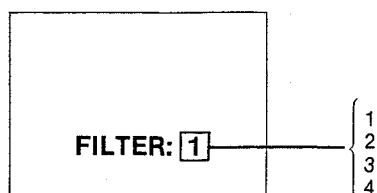
Indication of the shutter speed

When the electric shutter is used, the shutter speed is displayed. When a high-speed shutter is used, the video level will be lowered. Illuminate the object by the lights with sufficient brightness.

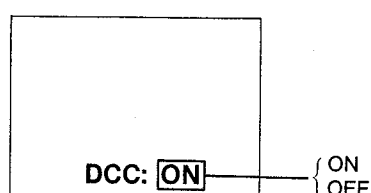
Displaying the Switch Setting

When the setting of switches is changed by the camera or CCU, the following display will appear, and extinguish after about 2 seconds.

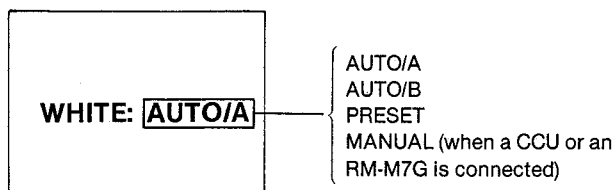
Selected optical filter



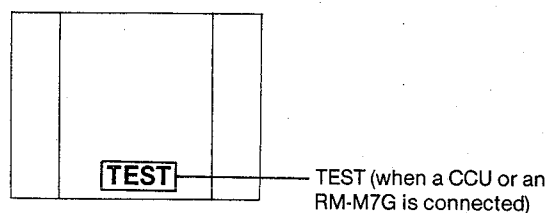
ON/OFF of DCC circuit



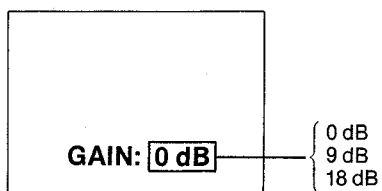
White balance adjustment mode



Output of the test saw signal



Gain of the video circuit



Note on a test saw signal

Without connecting a CCU or an RM-M7G, a test saw signal can be output by resetting the switch in the camera, and TEST will be displayed.

Warning Indications and Character Display

Checking and Changing the Switch Setting

The setting of switches can be checked and changed with the STATUS/FUNC switch.

Push the switch to the FUNC position or to the STATUS position.

When pushed to the STATUS position

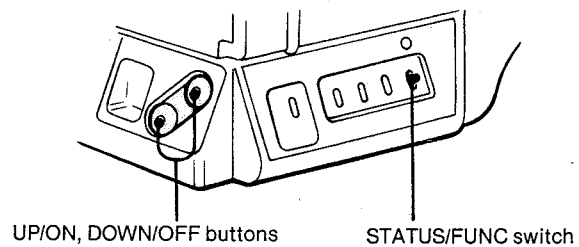
Normal screen



Push the switch to the STATUS position.

FILTER : 1
WHITE : AUTO/A
BLACK : AUTO
GAIN : 0 dB
DCC : ON

The current switch setting is displayed.



Push the switch to the STATUS position again.

INDICATION
L. LIGHT : ON
C. TEMP. : ON

ON/OFF of LOW LIGHT indication can be selected by the UP/ON or DOWN/OFF button.

Blinks



Push the switch to the STATUS position again.

INDICATION
L. LIGHT : OFF
C. TEMP. : ON

ON/OFF of C. TEMP. HI (color temperature is high) or C. TEMP. LOW (color temperature is low) indication can be selected by the UP/ON or DOWN/OFF button.

Blinks



Push the switch to the STATUS position again.

Normal screen

To retrieve the normal screen in operation
Push the STATUS/FUNC switch to the FUNC position.


- FILTER** The number of the selected optical filter is displayed.
- WHITE** AUTO/A or AUTO/B: Adjusted white balance value memorized in A or B memory.
PRESET: White balance under 3200K.
MANUAL: White balance value manually adjusted by the CCU-M7/M7P or CCU-M3/M3P.
- BLACK** AUTO: Automatically adjusted black balance value.
MANUAL: Black balance value manually adjusted by the CCU-M7/M7P or CCU-M3/M3P.
- GAIN** GAIN selector setting (0 dB, 9 dB or 18 dB)
- DCC** ON: Knee point is automatically adjusted according to the brightness of the object.
OFF: Fixed knee point.

These indications appear for about 2 seconds when the power of the video camera is turned on. However, if the power of the viewfinder is not turned on in advance, they may not appear.

When pushed to the FUNC position

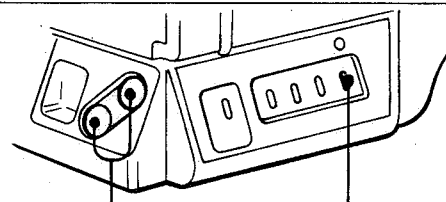
Normal screen

Push the switch to the FUNC position.

 A.IRIS : NORM
 KNEE : PRE
 M.PED : -29
 SHUTTER : OFF

Blinks

The iris which has been automatically adjusted can be adjusted again by +1, +0.5, -0.5, and -1 with the UP/ON or DOWN/OFF button. Adjust the iris using this function when an object against a bright background is to be shot.




UP/ON, DOWN/OFF buttons

STATUS/FUNC switch

When a CCU-M7/M7P, RM-M7G, or CCU-M3/M3P is connected

The iris, knee, masterpedestal and shutter speed can be controlled only from the connected equipment, not from the video camera. So the displays shown on the left will not appear.


Push the switch to the FUNC position again.

A.IRIS : -0.5
 KNEE : PRE
 M.PED : -29
 SHUTTER : OFF

Blinks

Knee point can be adjusted as follows with the UP/ON or DOWN/OFF button.
 MIN: For decreasing the knee effects.
 PRE: For the factory-preset value.
 MAX: For increasing the knee effects.

Push the switch to the FUNC position again.

A.IRIS : -0.5
 KNEE : MAX
 M.PED : -29
 SHUTTER : OFF

Blinks

Continued

Master pedestal level can be adjusted with the UP/ON or DOWN/OFF button. The adjustable range is from -31% (MIN is displayed) to +31% (MAX is displayed) against the reference level of 0.7 V. When shooting outdoors, adjust the master pedestal level so that the picture with desirable contrast is obtained. When both the UP/ON and DOWN/OFF buttons are pushed simultaneously, the level is set to the reference value, and the indication will be 00.

When the knee effects are increased

Bright part of the picture with high contrast can be reproduced clearly.

When the knee effects are decreased

Bright part is clipped, but the part under the clip level will be reproduced with high fidelity.

Dynamic Contrast Control (DCC) circuit

The DCC circuit detects the peak level of the object and controls the knee point so that the peak level is not over the white clip level. A light intensity level up to 600% can be reproduced.

When the DCC circuit is set to ON, the knee point setting with the UP/ON and DOWN/OFF buttons cannot be executed.

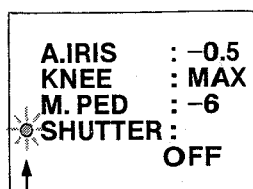
KNEE: AUTO indication will appear.

Level of knee point

Setting of knee	Knee point	Allowable light intensity
MIN	110 IRE	Approx. 300%
PRE	103 IRE	Approx. 450%
MAX	80 IRE	Approx. 600%

Warning Indications and Character Display

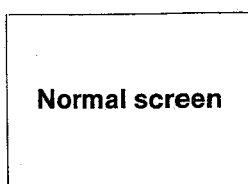
Push the switch to the FUNC position again.



Blinks



Push the switch to the STATUS position again.



The speed of the electric shutter can be selected with the UP/ON and DOWN/OFF buttons from among $\frac{1}{100}$, $\frac{1}{250}$, $\frac{1}{500}$, $\frac{1}{1000}$ and $\frac{1}{2000}$ seconds. OFF indication means that the shutter mode is set to OFF.

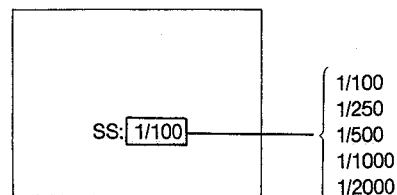
The normal screen will be retrieved.

To retrieve the normal screen in operation

Push the STATUS/FUNC switch to the STATUS position.

Function of the electric shutter

Select the appropriate shutter speed with the method mentioned on the left. When the electric shutter is used, the shutter speed is displayed on the viewfinder screen as shown below.



Note on the electric shutter

If the GAIN selector is set to the 18 (dB) position when the electric shutter is used, a clear picture may not be obtained. Use the electric shutter under the lighting conditions under which a clear picture is obtained with the GAIN selector set to the 0 or 9 (dB) position.

Additional indications

By resetting the switches in the camera, the 9 items shown on the right can be controlled with the UP/ON and DOWN/OFF buttons on the camera after the shutter speed setting. These items are usually controlled by the CCU.

The switch setting should be performed by the qualified service personnel. Consult your authorized Sony dealer.

Adjustable items

R GAIN
B GAIN
R PED (pedestal)
B PED
M GAM (master gamma)
R GAM
B GAM
DTL
KNEE

After the knee setting, push the STATUS/FUNC switch to the FUNC position, and the normal screen will be retrieved.

Memorizing the adjusted values

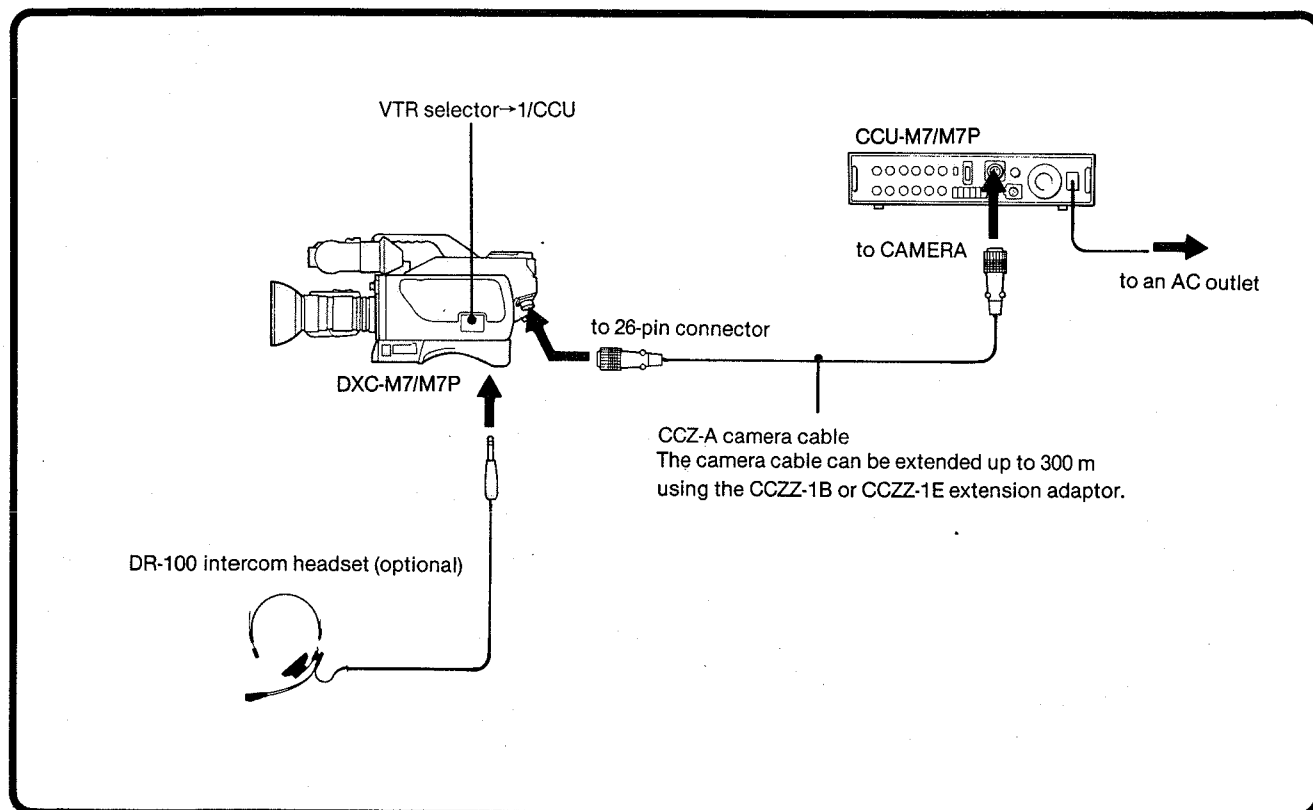
By setting the switches in the camera, the adjusted values including the items in "Additional indications" are automatically stored in the non-volatile memory when the normal screen is retrieved.

Studio Use

When using two or more cameras simultaneously in a video studio, a special effects generator SEG-2550A/2550AP, etc. is necessary for wiping and switching, and CCU-M7/M7P or CCU-M3/M3P camera control unit for matching all the camera's picture quality and color.

Viewfinders for studio use such as DXF-40/40CE, DXF-50/50CE, are also recommended. For details on the studio system, consult your authorized Sony dealer.

Connecting the Camera to the CCU-M7/M7P Camera Control Unit



Notes on the connection with the CCU-M7/M7P or CCU-M3/M3P

- The GAIN selector, OUTPUT (DCC ON/OFF) selector, SC switch, H PHASE adjustment screw and SC PHASE adjustment screw on the camera will be inoperative.
- The microphone output level will be -20 dB independent of the MIC LEVEL selector setting on the camera.
- The FUNC side of the STATUS/FUNC switch on the camera will be inoperative.
- The white balance can be adjusted on the camera only when the white and black balance adjustment mode is set to the automatic mode on the CCU-M7/M7P or CCU-M3/M3P.
- When the camera is connected to the CCU-M3/M3P, the MIC IN connector of the camera cannot be used because the audio output connector is not equipped on the CCU-M3/M3P. Connect the microphone directly or through a mixing console, etc., to the VTR.

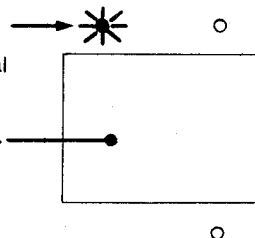
DXC-M7P (EK)

DXC-M7PM (BRZ)

Tally indication

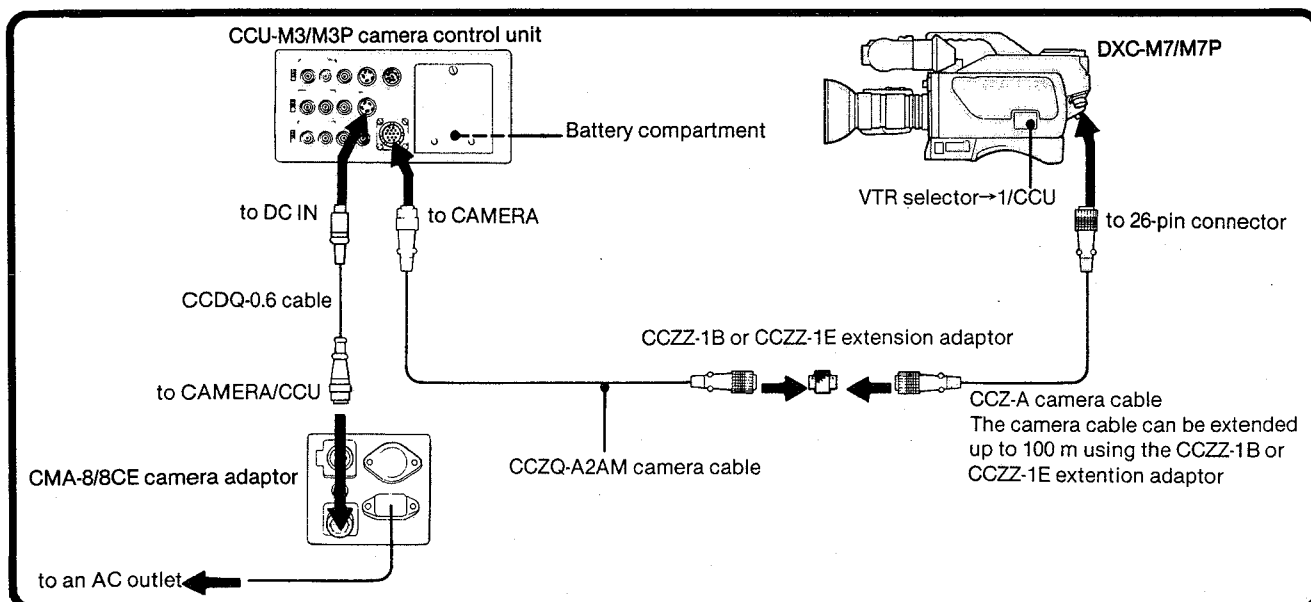
This indicator is lit when a switcher or special effects generator selects the signal picked up by the camera.

Viewfinder screen.



Studio Use

Connecting the Camera to the CCU-M3/M3P Camera Control Unit



Storing the Values Adjusted by the CCU in the Memory of the Camera

By resetting the switch in the camera, the value adjusted by the CCU can be stored in the memory of the camera head.

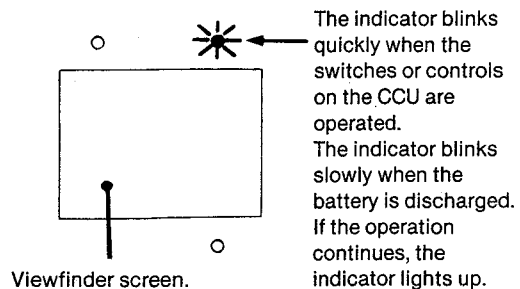
Note

When the knee value adjusted by the CCU is stored with this method, the factory preset knee value is cleared, and the display of "KNEE: PRE" will not appear.

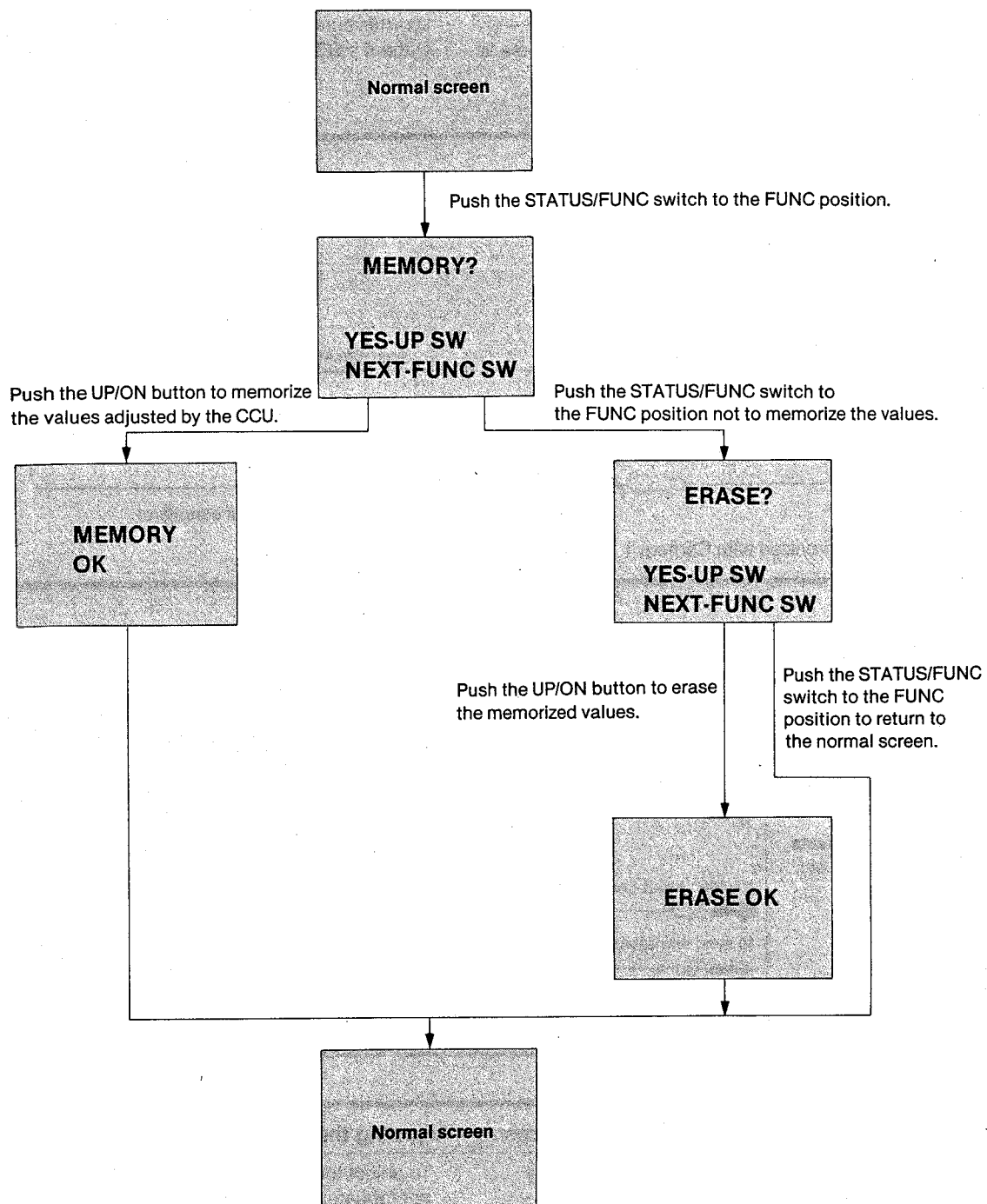
Memorized items

R GAIN
B GAIN
M PED (pedestal)
R PED
B PED
M GAM (Master gamma)
R GAM
B GAM
DTL
KNEE

Indication when the CCU-M3/M3P is operated with a battery



Memorizing Procedure



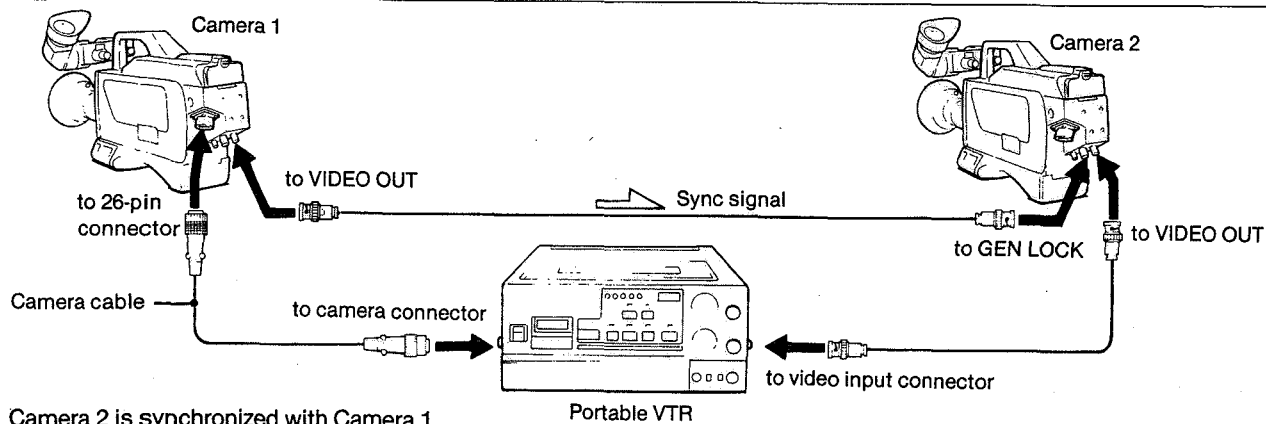
Studio Use

Use of the GEN LOCK Connector

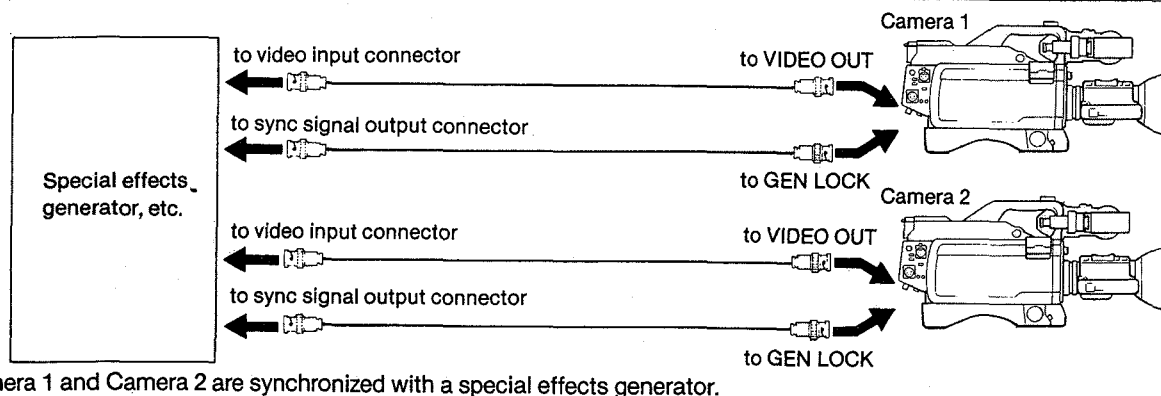
When an external sync signal, composite video or black burst, is supplied to the GEN LOCK connector, the camera is synchronized with the supplied signal.

Use this connector when two or more cameras are used without a CCU.

Example 1



Example 2



Adjusting the picture tone for two or more cameras—Adjusting the subcarrier phase and horizontal phase

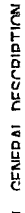
When two or more cameras are used simultaneously in connection with a special effects generator, etc., supply the same reference signal to all cameras, and adjust each camera to obtain the same picture tone with the subcarrier (SC) or horizontal (H) phase adjustment screws.

To adjust the SC phase, set the SC phase selector appropriately, then adjust it with the SC PHASE adjustment screw precisely. It is recommended to use a vectorscope for easy adjustment.

To adjust the H phase, turn the H PHASE adjustment screw. It is recommended to use a waveform monitor or an oscilloscope.

GENERAL DESCRIPTION

GENERAL DESCRIPTION



1-45

Hints for Better Shooting

Understanding Light and Color

Brightness Levels

The single greatest influence on picture quality is the brightness level. Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording.

When to use an ND filter

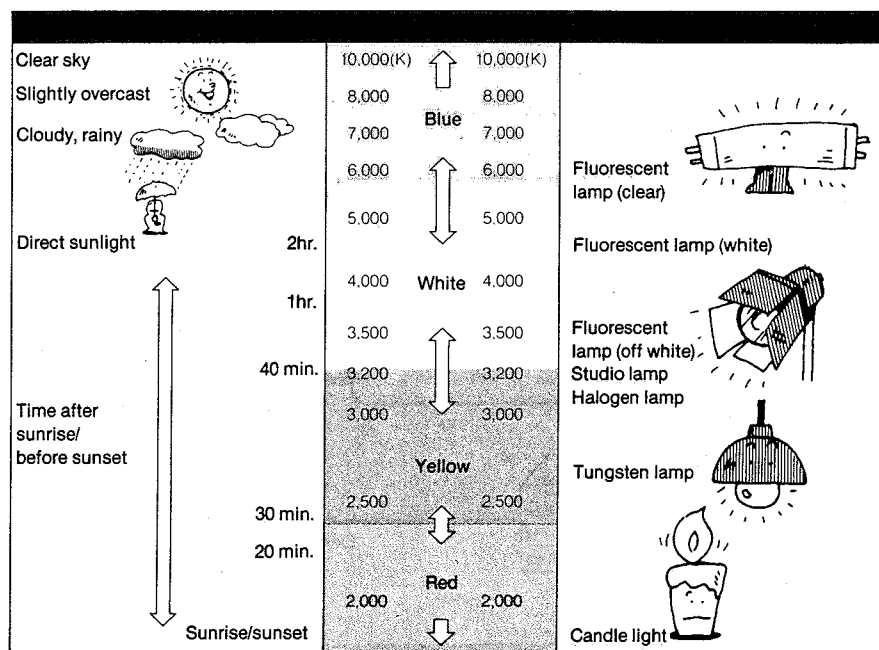
Exceptionally bright scenes such as sunny days at the beach in summer or on snow fields in winter will look "washed out" when recorded. To make these scenes recorded naturally, an ND filter (set the FILTER selector to the 2 or 4 position) is required.

Unit: lux	
	Snow-covered mountains Snow fields Sandy beach, clear day in summer
100,000	Clear day, mid-day (100,000) Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)
10,000	Overcast day, one hour after sunrise (2,000)
1,000	Office lit by fluorescent lamps, near window (1,000) Clear day, one hour before sunset (1,000)
500	Department store counter (500 ~ 700) Station wicket (650) Office lit by fluorescent lamps (400 ~ 500) Room lit by two 30 W fluorescent lamps (300)
300	Subway station platform (300)
100	Arcade at night (150 ~ 200) Theater lobby (15 ~ 35) Candle light (10 ~ 15)
10	

Color Temperature—How It Effects White Balance Adjustment

If the temperature of an object continues to increase, it will eventually begin giving off light. At this time, there is a fixed relationship between the object's temperature and its "light color." The temperature of the object radiating the light is expressed in absolute temperature (K).

This is also known as the color temperature, which in turn stands for "light color." As color temperature increases, the light color changes from red to yellow to white to blue.



Basic Camerawork

Getting Stable Pictures—Starts with a Correct Stance

For Hand-held Shots, Shooting Position is the Key.

Using three basic positions as a reference, practice shooting positions until you find the stance which provides the easiest shooting and best results.

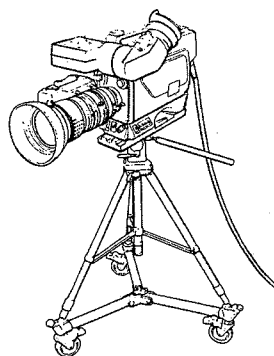


- When kneeling, placing one knee on the ground provides the best stability.
- Place the eye firmly against the viewfinder eyecup.
- For hand-held shots, put the camera on your shoulder and assume a comfortable, stable position. Make sure the camera does not move.
- Relax your shoulders.
- Put your right elbow firmly against your side to help stabilize the camera.
- If you are going to move the unit while recording, keep both eyes open as much as possible.
- Stand firmly with your feet comfortably apart. Leaning against something firm such as a wall or tree will also provide extra stability.

Use a Tripod or Monopod If Possible

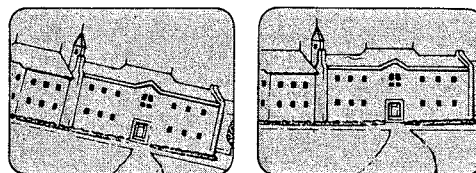
Use a sturdy one.

If a tripod is not available, try placing the camera on a tabletop, wall, or any other flat surface of suitable height.



Keeping The Horizontal Plane Level

Even if camera work is smooth and stable, shots can be tilted or off axis horizontally.



The horizontal plane can be easily determined by using the viewfinder frame as a reference.

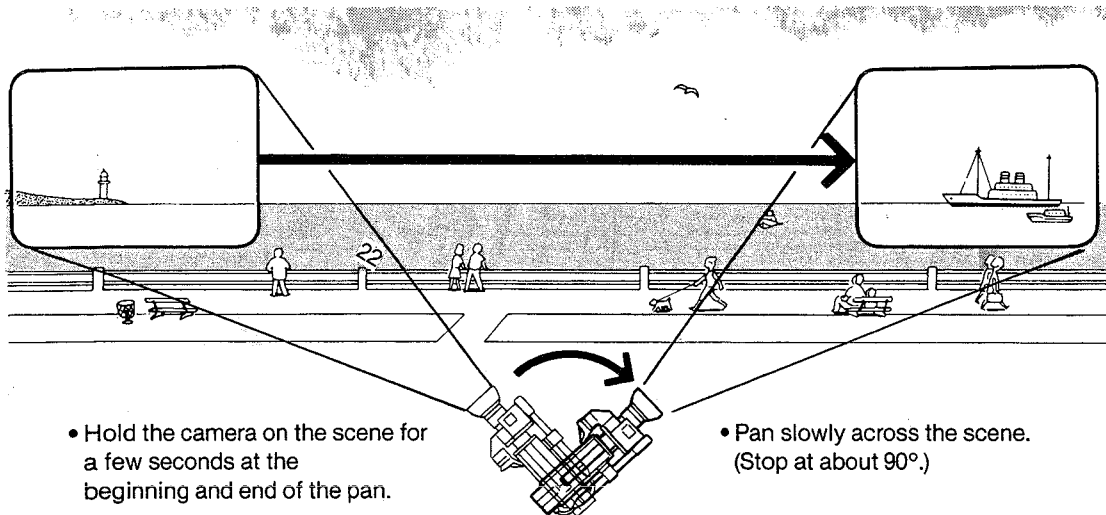
Hints for Better Shooting

Three Frequently Used Shots

These three types of shots will bring additional action and movement to your scenes when properly used. For greatest effect, it is advisable that they not be overused.

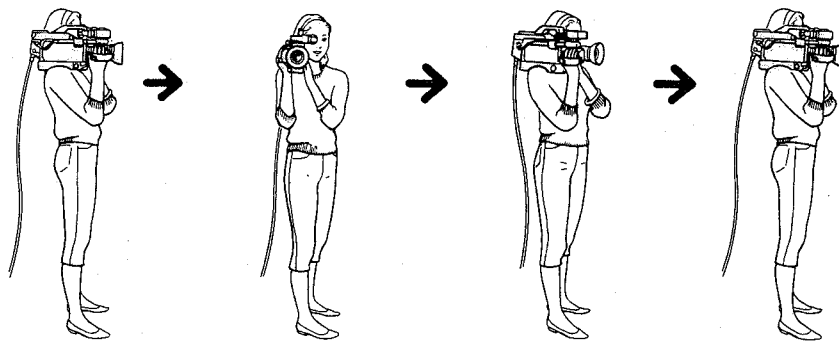
Panning —Moving the Camera Horizontally

For emphasizing the grandeur of a scene, and for including all of the scenery in a single continuous shot.



For Professional-looking Pans

- 1 First, stand so that you face in the direction where the pan will end.
- 2 Without moving your feet, rotate your upper body so that your camera faces the direction where the scene will begin.
- 3 Start shooting. Rotate your body slowly to the point where the pan will stop.



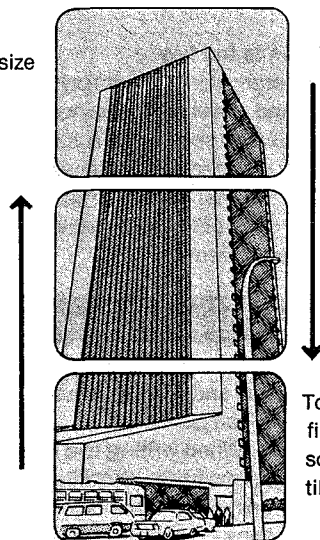
The best panning speed is one that will allow you to explain the scene during playback.

Repeated pans of the same scene should be avoided.

If you can hold your breath during panning and zooming, camera shake can be minimized, and you can concentrate more easily on the scene.

Tilting —moving the camera vertically
Tilting shots with the camera should be slightly faster than pans.

To emphasize height... tilt up.



To emphasize the final part of the scene.. tilt down.

Zooming —changing the size of the subject

Because telephoto shots make camera shake more noticeable, the camera should be as stable as possible.

To draw attention to something specific... zoom in.



To end the shot by making the circumstances surrounding the scene understood...zoom out.



Sizing the scene-mixing long, medium and close-up shots

Continuous use of long shots or close-ups will give your productions a monotonous "flat" impression. To avoid this, it is important to consider exactly what it is that you wish to "say" with every shot. Indeed, it is possible to change the impression that any subject makes merely by changing the way it's shot.



You don't have to change the subject to alter the scene—you can achieve a different effect by changing the size of the subject itself within the scene.

Framing people

Basic shots for properly framing people are shown below.

Experience has shown that shots that frame people differently than this do not have as pleasant an effect.

Face shot

Even if you cut off the hairline, don't cut off the chin.



When shooting a profile, leave the space in front of the face to create a "sight line."

Bust shot—

Chest and above



Waist shot—

Upper hips and above



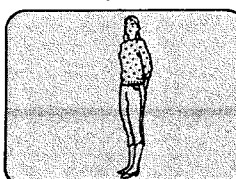
Knee shot—

Knees and above



Full shot—

Entire body



Hints for Better Shooting

Cutting

Scene Length

—not too long, not too short

While there's no hard-and-fast rule, it is generally advisable to make each scene 6–7 seconds in length for easier viewing.

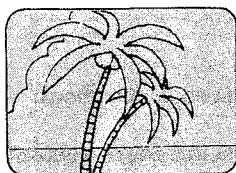
A succession of short scenes can tire the viewer, while long, single scenes can become boring.

Cutting according to the narration

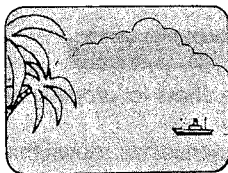
Cut the scene when the narration is finished.

Cutting according to the subject

Close-ups shorter.



Make long shots longer.

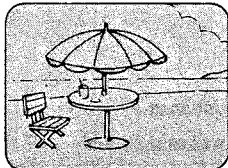


Because long shots have more to see in them than close-ups, show them longer so the viewer may understand what's there.

Make interesting shots and shots in which the subject is constantly moving longer.



Make static shots shorter.



Shoot as if you were watching the playback. That is, it's helpful to occasionally imagine your commentary of the scene even as you're shooting it!

For More Effective Production

In video, organization is the key

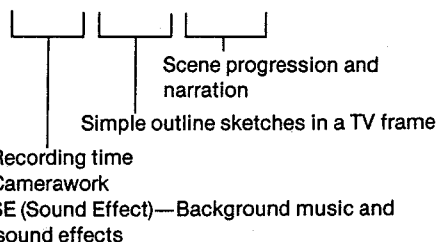
To make a first-class production, it is important to decide the contents and shooting sequence in advance. The first step is to sketch out a simple outline of the actual production based on the time-tested "five W's of journalism" (who, what, where, when, why, how). This will allow you to efficiently and effectively record the many exciting events.

Write a script of what you want to record

After the theme has been decided, think about the progression of the scenes and write down the major points of the "story flow" on paper. This is called a scenario. When writing the script, it is helpful to scout the location where shooting will take place, and, in the event of school activities or weddings, to obtain a copy of the program in advance, if possible. This will allow you to complete actual recording with a minimum of bother.

Typical scenario

Football Tournament page 1		
5 sec Title		Narration: Mom "X month, Y day at Z tried"
10 sec Zoom out		Me I'm all ready to go
6 sec Cut in		
30 sec. Cut out Panning		Mom's voice introducing the stadium, atmosphere, etc.
2 min 10 sec		Show the player's ex- pressions
2 min 15 sec Zoom in		Show the ex- citement in the stands



Lighting

For the Sharpest Pictures, You Need the Best Light

For the most brilliant color in your scenes, a sufficient light level must be maintained. If shooting is done indoors or under other circumstances where light is insufficient, lights must be used for best results.

Choosing the right lights

Photography lamps or halogen lamps are recommended.

For lighting of a wide area for easy use – reflector flood light

To emphasize the subject – use a reflector spotlight.

Lighting the subject

The number of lights and their angle to the subject can make a significant difference in lighting effectiveness.

With a single light:

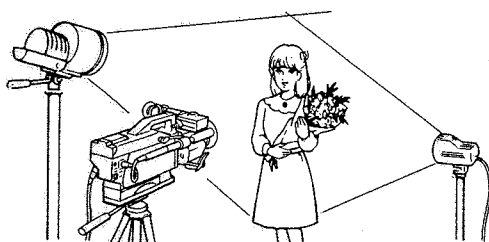
Locate it above and to one side of the subject. With just one light, contrast is unavoidably enhanced.

To eliminate shadows, another light should be added.

With two lights:

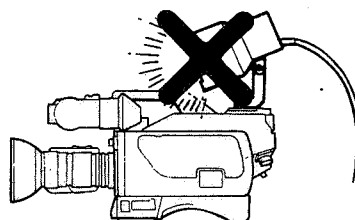
Locate one light above and to one side of the subject, and the second to the side of the subject in such a position that the shadows are eliminated.

If contrast is too strong when lights are used, point a light at the ceiling or reflect it off a sheet of white paper to add soft fill-in light.



Precautions for using lights

- Do not point the light at the camera body. Instead, make sure that it is pointed parallel to the camera or away from it. Be especially careful with lights attached to the accessory shoe.



- Floodlights (lights with wide dispersion) must not be attached to the accessory shoe. Use of a special light stand is recommended.
- Lights become extremely hot during use – do not touch them!
- Do not mix different types of light, as light color temperatures vary and can cause the subject's color to be recorded incorrectly.

For detailed instructions on proper use of lights, carefully read the instruction manuals that accompany them.

Accessories supplied

CCZQ-A2 camera cable
(supplied with the DXC-M7/M7K only) (1)
VCL-915BYA zoom lens (supplied with the DXC-M7K only) (1)
DXF-M7/M7CE electronic viewfinder
(supplied with the DXC-M7/M7P/M7K/M7PK only) (1)
LC-M7G carrying case
(supplied with the DXC-M7/M7P/M7K/M7PK only) (1)
VTC-14 tripod attachment
(supplied with the DXC-M7/M7P/M7K/M7PK only) (1)
Lens cap (1)
Flange focal length adjustment chart (1)
CAC-1 microphone holder
(supplied with the DXC-M7/M7P/M7K/M7PK only) (1)
Spacer for microphone holder
(supplied with the DXC-M7H/M7PH only) (1)
Microphone holder screws
(supplied with the DXC-M7H/M7PH only) (2)
Instruction Manual (1)

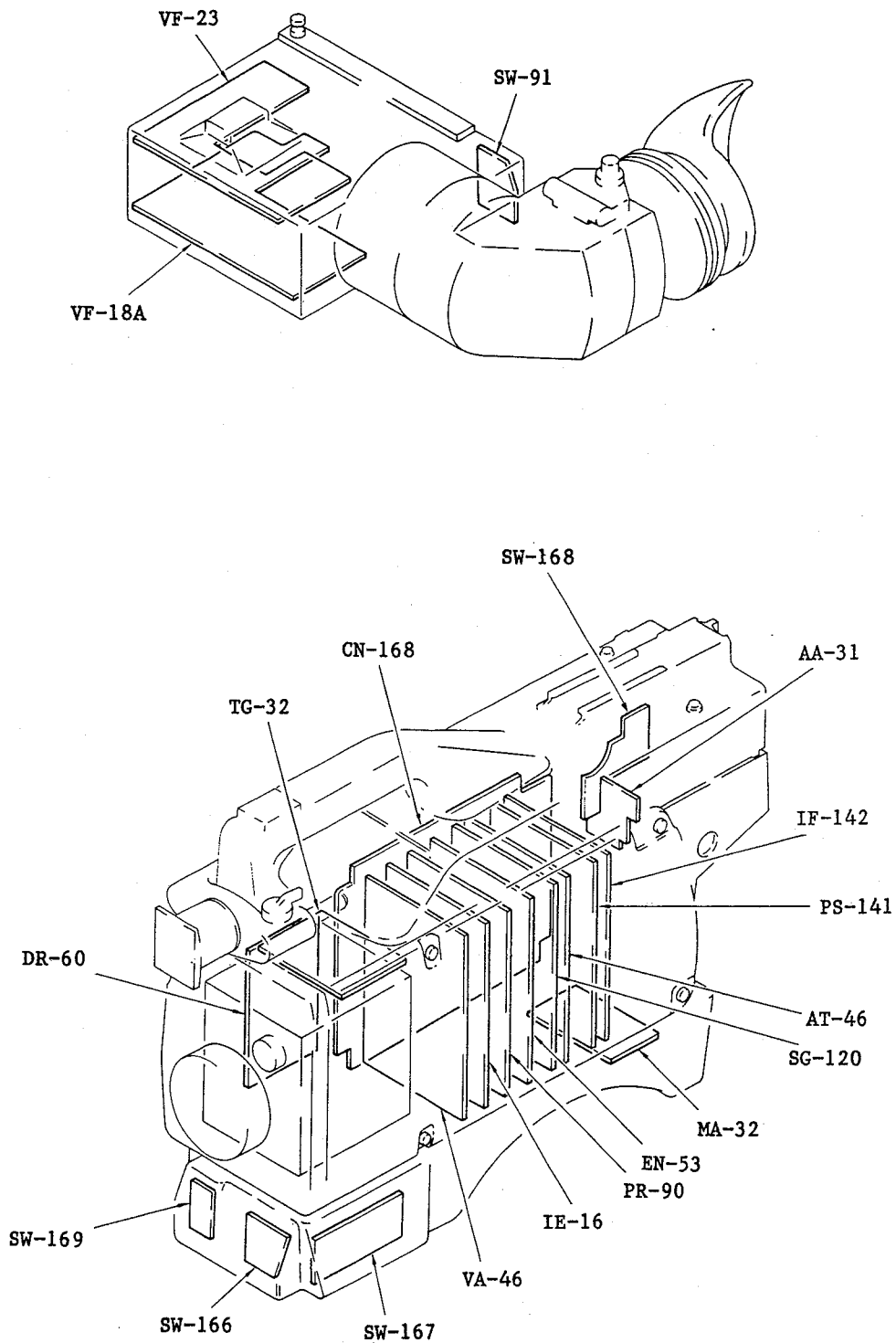
Design and specifications are subject to change without notice.

OPTIONAL ACCESSORIES AND RECOMMENDED EQUIPMENT

Camera control unit: CCU-M7/M7P, CCU-M3/M3P
Special effects generator: SEG-2000A/2000AP, SEG-2550A/2550AP
Universal chroma keyer: CRK-2000/2000P
Wipe pattern extender: WEX-2000/2000P
Portable videocassette recorder: VO-6800/6800PS
Electronic viewfinder (5-inch, B/W): DXF-50/50CE
Electronic viewfinder (4-inch, B/W): DXF-40/40CE
Electronic viewfinder (1.5-inch, B/W): DXF-M7/M7CE
Camera adaptor: CMA-8/8CE
Battery adaptor: DC-8
Battery pack: NP-1A
Battery charger: BC-1WA
Battery shoe: CAC-21
Zoom lens: VCL-915BYA
Lens remote control unit: LO-26
Condenser microphone: ECM-672, C-74
Microphone holder: CAC-1
Microphone cable: EC-0.5C2
Intercom headset: DR-100
Camera cable with Z-type 26-pin and Q-type 14-pin
connectors: CCZQ-A2 (2 m), CCZQ-A5 (5 m), CCZQ-A10 (10 m)
Camera cable with Z-type 26-pin connectors: CCZ-A2 (2 m),
CCZ-A5 (5 m), CCZ-A10 (10 m), CCZ-A25 (25 m), CCZ-A50 (50 m),
CCZ-A100 (100 m)
Camera cable with Z-type 26-pin and J-type 10-pin
connectors: CCZJ-2 (2 m), CCZJ-5 (5 m)
Camera cable with Z-type 26-pin and Q-type 14-pin
connectors (for CCU-M3/M3P): CCZQ-A2AM (2 m)
CCZ-A cable extension adaptor: CCZZ-1B, CCZZ-1E
Tripod attachment: VCT-14
Rack mounting metal: RMM-1800
Carrying case: LC-M7G
Camera adaptor: CA-M7
Viewfinder attachment metal: CAC-50
Remote control unit: RM-M7G
Camera remote control cable: CCA-7-5 (5 m), CCA-7-20 (20 m),
CCA-7-50 (50 m), CCA-7-100 (100 m)

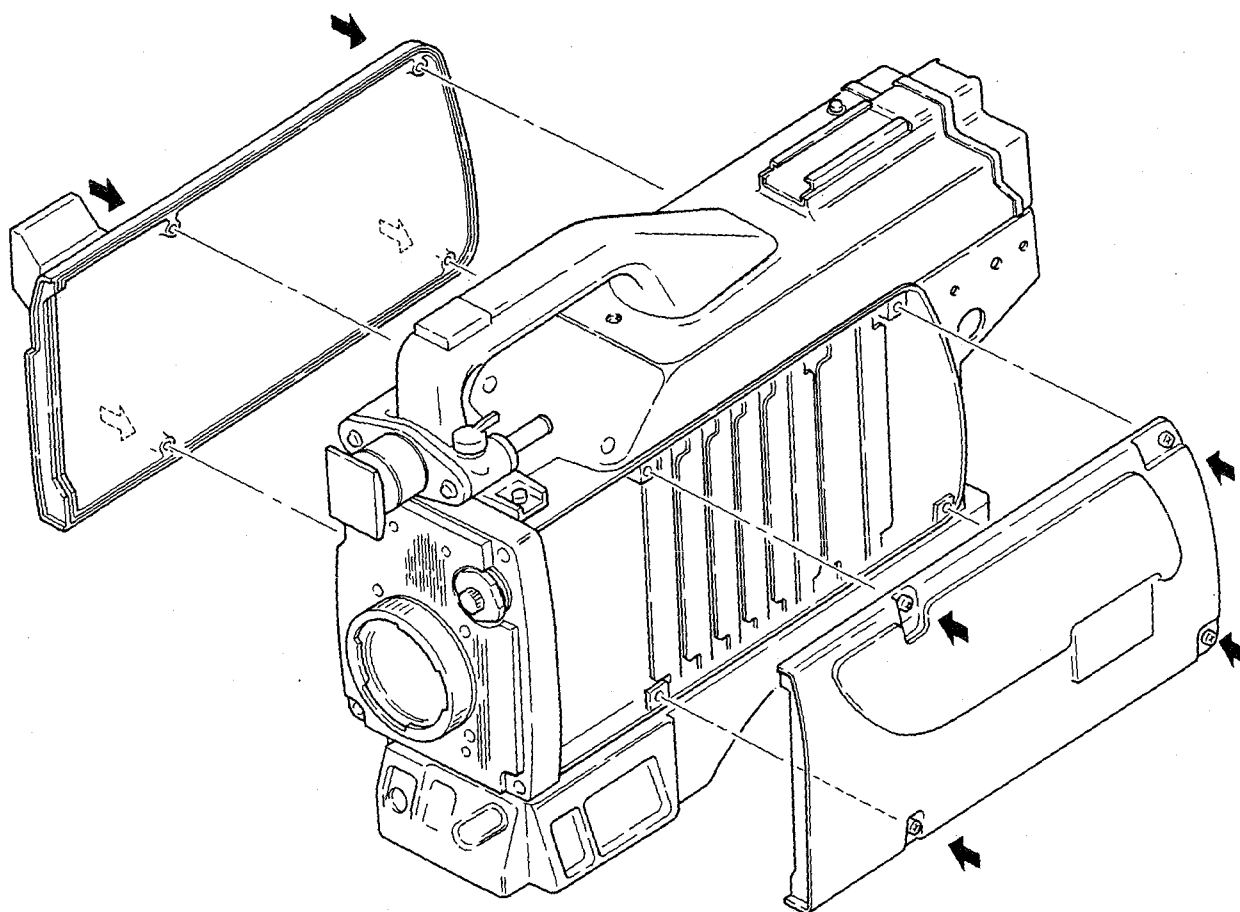
SECTION 2 SERVICE INFORMATION

2-1. BOARD LAYOUT



2-2. REMOVAL OF THE OUTER COVERS

Loosen each of the four screws and remove the right and left covers.



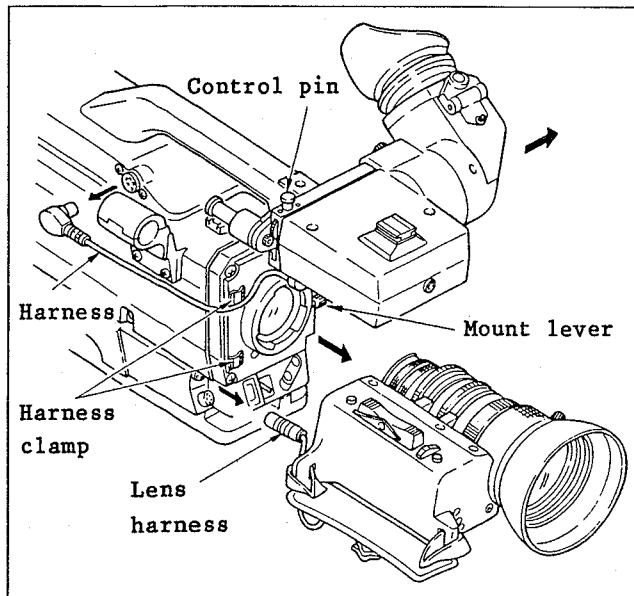
DXC-M7 (UC)
DXC-M7P (EK)
DXC-M7PM (BRZ)

2-3. REPLACEMENT OF THE MAIN PARTS

2-3-1. Replacing the Front Unit

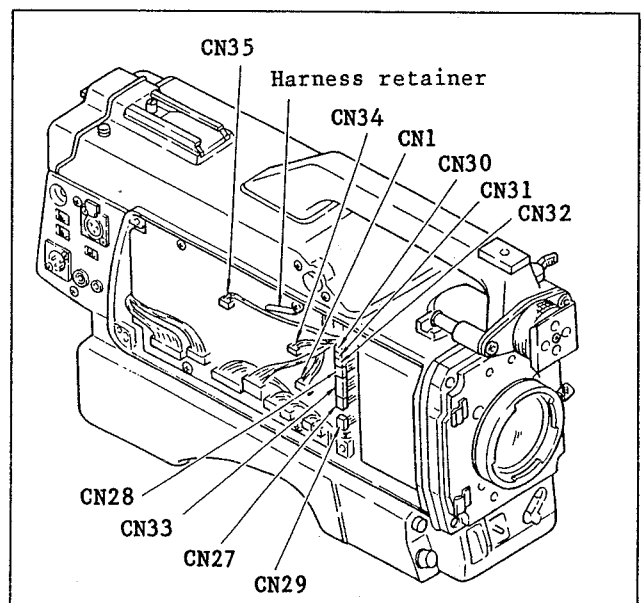
Note: When replacing the CCD block, replace it together with the front unit.

1. Disconnect the lens harness and remove the lens by turning the mount lever counterclockwise. Remove the VP harness from the harness clamp and remove the viewfinder by sliding it in the direction of the arrow while pulling the control pin up.

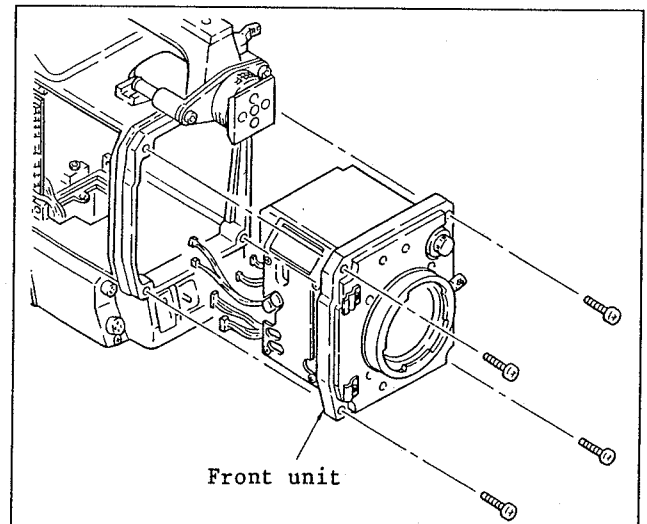


2. Remove the left side panel. (Refer to REMOVAL OF THE OUTER COVERS.)

3. Disconnect CN1, CN27, CN28, CN29, CN30, CN31, CN32, CN33, CN34, and CN35 from the CN-169 board. Straighten the harness retainer shown below and remove the harness.



4. Remove the four screws located on the front panel and pull out the front unit.



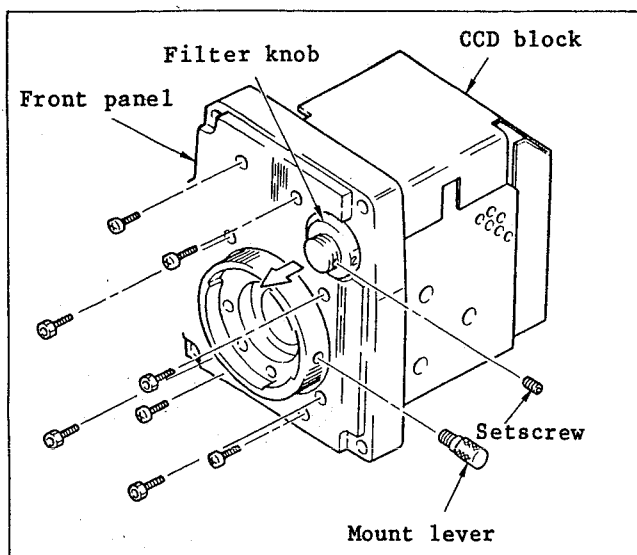
5. Install a new front unit by reversing the procedures from 1 to 3.

2-3-2. Replacing the Filter Plate

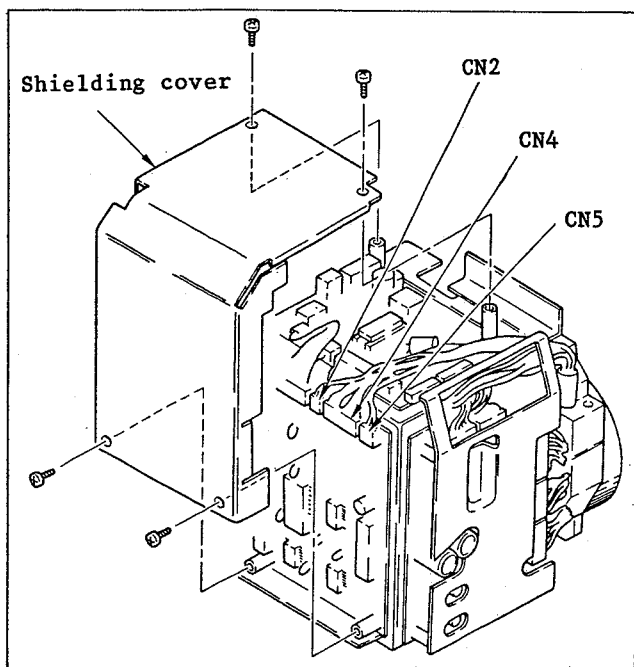
1. Remove the front unit by following procedures 1 to 4 in Replacing the front unit.
2. Loosen the setscrew shown below and remove the filter knob.

Remove the mount lever.

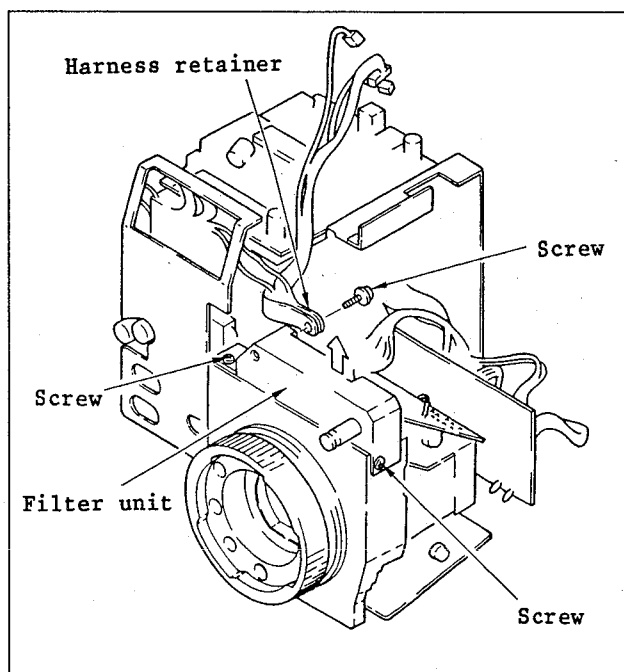
Remove the eight screws from the front panel and remove the CCD block.



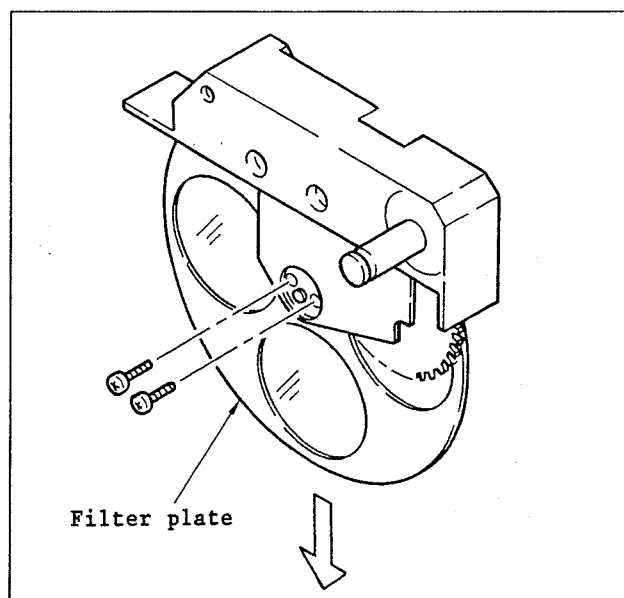
3. Remove the four screws shown below and remove the shielding cover. Disconnect CN2, CN4, and CN5 from the NR-22 board.



4. Remove the screw which fixes the harness retainer and remove the harness retainer. Remove the two screws shown below and extract the filter unit in the direction of the arrow.



5. Remove the two screws shown below and remove the filter plate.



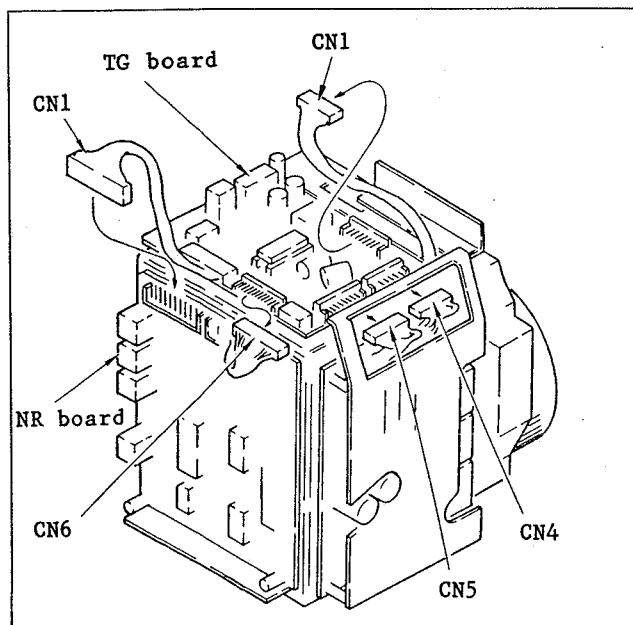
6. To install a new filter plate, reverse the procedures from 1 to 5.

DXC-M7 (UC)
DXC-M7P (EK)
DXC-M7PM (BRZ)

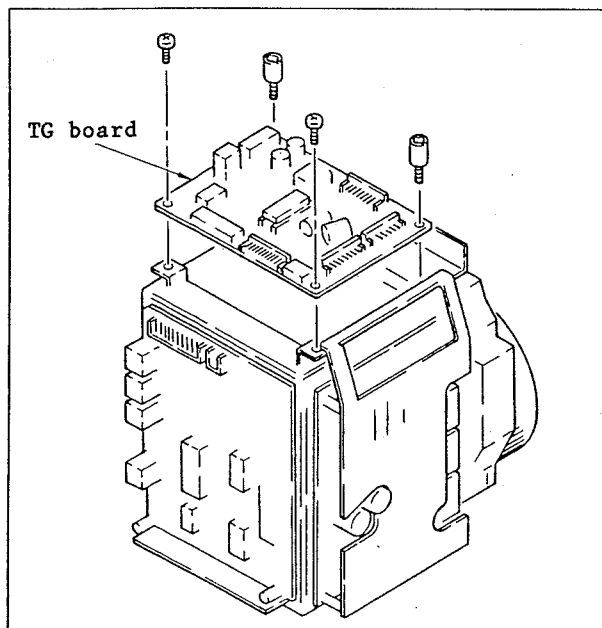
2-3-3. Replacement of TG Board

Note: Be sure to change the ROM when replacing the TG-32 board.

1. Perform the procedures from 1 to 3 of Replacing the front unit.
2. Disconnect CN1, CN4, CN5, and CN6 from the TG board. Disconnect CN1 from the NR board.



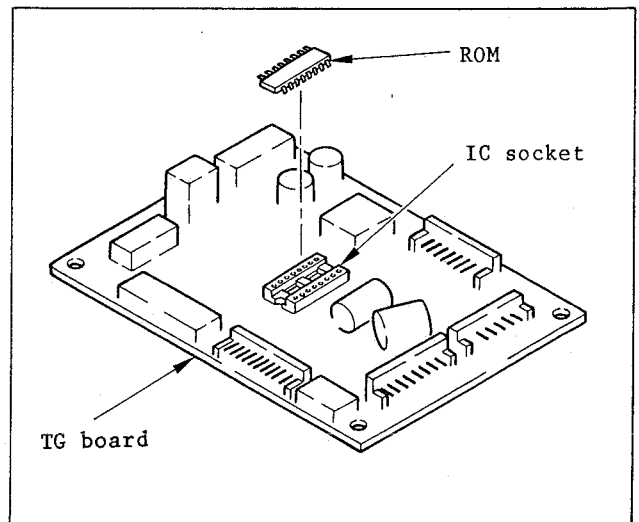
3. Remove the two screws and two support rods shown below and remove the TG board.



4. To install a new TG board, reverse the procedures from 1 to 3.

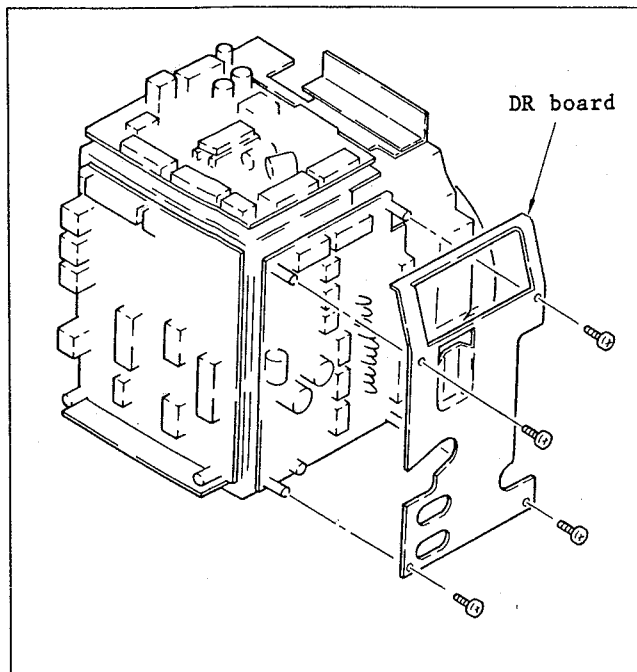
5. Take out the ROM from IC socket (CN13) on the TG-32 board and insert it to IC socket (CN13) on the new TG-32 board.

When the TG-32 board is replaced, be sure to replace the ROM.

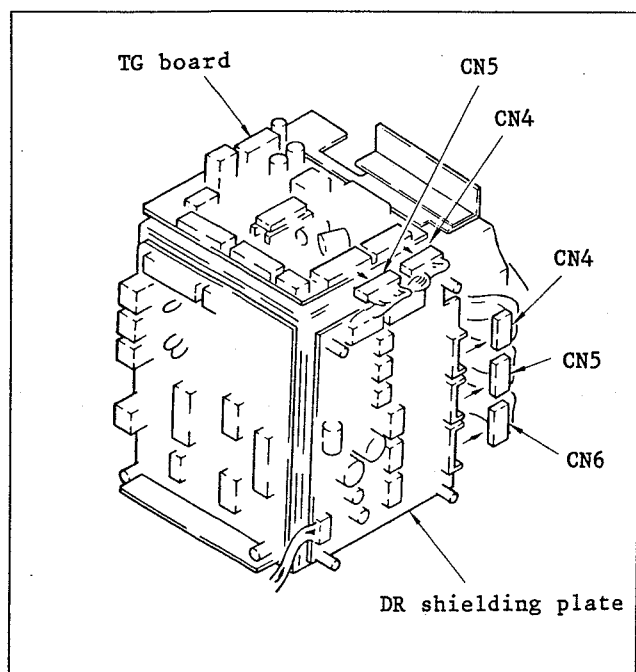


2-3-4. Replacement of DR Board

1. Perform the procedures from 1 to 3 of Replacing the filter plate.
2. Remove the four screws shown below and remove the DR shielding plate.

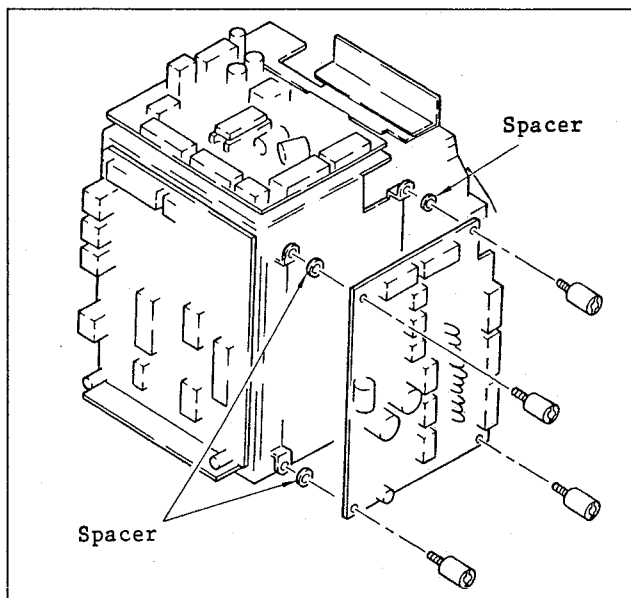


3. Disconnect CN4, CN5, and CN6 from the DR board. Remove CN4, and CN5 from the TG board.



4. Remove the four support rods and remove the DR board.

Note: Be careful not to lose the four spacers (four pieces).



5. To install a new DR board, reverse the procedures from 1 to 4.

2-4. CONNECTORS AND CABLES

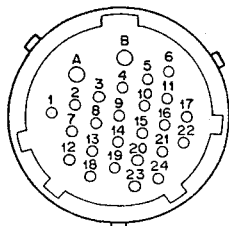
2-4-1. Connector Input/Output Signals

The main connector input/output signal as follows.

VIDEO OUT (BNC): 1.0Vp-p±0.1V, sync negative
75ohm

GENLOCK (BNC) : 1.0Vp-p, sync negative
75ohm

CCZ (26P, MALE)




(EXT VIEW)

No.	SIGNAL	SPECIFICATION
A	EXT DC (CCZ) IN (X)	10.5 to 17.0 Vdc (at 3 A)
B	EXT DC IN (G)	GND for POWER
1	EN VIDEO OUT (X)	VBS=1.0 Vp-p±1 dB (100%) Zo=75 Ω±5 % DC=0±100 mV
2	EN/CF/CHROMA (G)	GND for ADP VIDEO
3	G/Y/Y OUT (G)	GND for Y
4	G/Y/Y OUT (X)	VS=1.0 Vp-p±0.5 dB (100%) Zo=75 Ω±5% DC=0±200 mV
5	R/R-Y/CHROMA OUT (X)	V=714/700/286 mVp-p (BURST)±2% (75% COLOR BARS) Zo=75 Ω±5% DC=0±200 mV
6	R/R-Y/CHROMA OUT (G)	GND for R-Y
7	B/B-Y OUT (X)	V=714/700 mVp-p±2% (75% COLOR BARS) Zo=75 Ω±5% DC=0±200 mV
8	B/B-Y OUT (G)	GND for B-Y
9	MIC OUT (X)	-60 dBm/-20 dBm Zo≤600 Ω
10	MIC OUT (Y)	BALANCED
11	MIC OUT (G)	GND for MIC
12	VTR START/STOP OUT TALLY OUT	START: 4.5±0.5 V STOP: 0+0.5 V Zo≤10 kΩ

DXC-M7 (UC)

DXC-M7P (EK)

DXC-M7PM (BRZ)

No.	SIGNAL	SPECIFICATION
13	BATT IND IN/ S DATE	Zi=300 Ω (Note. 1)
14	SENS (+) IN	+12.0 V
15	REC ALARM IN	Zi≥20 kΩ (Note. 2)
16	GENLOCK IN (G)	
17	INCOM IN/ OUT (G)	GND for AUDIO MONITOR
18	RET/PB VIDEO IN (X)	Zi=75 Ω±5% VS=1.0 Vp-p±1% (100%) DC=0±200 mV
19	RET/PB VIDEO IN (G)	GND for PB VIDEO
20	AUDIO MONITOR IN	Zi=750 Ω (1 kHz) SAVE: 4.5±0.5 V STANDBY: 9.0+1.0 V -0.5 V Zo≥10 kΩ
21	GENLOCK IN (X)	Zi=75 Ω±5% VBS=1.0 Vp-p
22	CF/CHROMA OUT (X)	 5.0±1.0 Vp-p (CF) 286 mVp-p (BURST) (CHROMA) Zo=1 kΩ±5% (CF) 75 Ω (CHROMA) DC block
23	INCOM IN/ OUT (X)	Zo=600 Ω
24	INCOM IN/ OUT (Y)	

. The case of connecting to the VTR

^{*3} S2	VTR 1 (B-CAM. U)			VTR 2 (VHS)	VTR 3 (S-VHS)
^{*4} S1	RGB	AUTO	Y/C	AUTO	AUTO
1	EN VIDEO OUT (X)	EN VIDEO OUT (X)	EN VIDEO OUT (X)	EN VIDEO OUT (X)	^{*1} Y OUT (X)
2	EN VIDEO/ CF OUT (G)	EN VIDEO/ CF OUT (G)	EN VIDEO/ CF OUT (G)	EN VIDEO/ CF OUT (G)	Y/CHROMA OUT (G)
3	G OUT (G)	Y OUT (G)	Y OUT (G)	————	————
4	G OUT (X)	^{*2} Y OUT (X)	^{*1} Y OUT (X)	————	————
5	R OUT (X)	R-Y OUT (X)	CHROMA OUT (X)	————	————
6	R OUT (G)	R-Y OUT (G)	CHROMA OUT (G)	————	————
7	B OUT (X)	B-Y OUT (X)	————	————	————
8	B OUT (G)	B-Y OUT (G)	————	————	————
22	CF OUT (X)	CF OUT (X)	CF OUT (X)	CF OUT (X)	CHROMA OUT (X)

. The case of connecting to the CCU

^{*3} S2	CCU		
^{*4} S1	AUTO		
^{*5} S3	Y/C	GBR	Y, B-Y, R-Y
1	EN VIDEO OUT (X)	EN VIDEO OUT (X)	EN VIDEO OUT (X)
2	EN VIDEO/ CF OUT (G)	EN VIDEO/ CF OUT (G)	EN VIDEO/ CF OUT (G)
3	Y OUT (G)	G OUT (G)	Y OUT (G)
4	^{*1} Y OUT (X)	G OUT (X)	^{*2} Y OUT (X)
5	CHROMA OUT (X)	R OUT (X)	R-Y OUT (X)
6	CHROMA OUT (G)	R OUT (G)	R-Y OUT (G)
7	————	B OUT (X)	B-Y OUT (X)
8	————	B OUT (G)	B-Y OUT (G)

*1 Y/C

*2 COMPONENT

*3 DXC-M7/M7P/M7PM IF-142 BOARD
(side panel)

*4 DXC-M7/M7P/M7PM IF-142 BOARD
(side panel)

*5 CCU-M7/M7P Rear panel

Note 1: Pin 13 (BATT IND)

The VTR contains the battery voltage detector and WARNING signal generator. These circuits warn the camera of a drop of battery voltage by sending the signal shown below to pin 13.

Receiving this warning, the camera make the LED (light-emitting diode) blink or light.

VTR Battery voltage	more than 11.1 Vdc	10.8 to 11.1 Vdc	less than 10.8 Vdc
Specification	2.5 ± 0.5 V 0 ± 0.5 V	1 ± 0.2 Hz or 4 ± 0.8 Hz (duty $50 \pm 1\%$)	
LED in Viewfinder	Goes out	Blinks	Lights

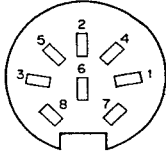
Note 2: Pin 15 (REC/TALLY)

The signal informing the camera of the VTR operation states appears at pin 15.

The specification is shown below.

Specification	5.0 ± 1.0 V 2.5 ± 0.5 V 0 ± 0.3 V 1 ± 0.2 Hz or 4 ± 0.8 Hz (duty $50 \pm 1\%$)
VTR Operation	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> VTR power is "OFF" </div> <div style="text-align: center;"> VTR power is "ON" </div> <div style="text-align: center;"> VTR ALARM </div> <div style="text-align: center;"> VTR RECORD </div> </div> <div style="text-align: right; margin-top: 10px;"> REC RERET 10 to 100 ms </div> <p>VTR ALARM: When the VTR is out of order, or the VTR starts recording</p> <p>VTR RECORD: When the VTR is recording</p> <p>VTR RESET: When the VTR stops recording</p>

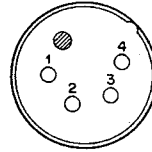
VF (8P, FEMALE)



(WIRING SIDE)

No.	SIGNAL	SPECIFICATION
1	EXT DC OUT (G)	GND for +12 V
2	REC TALLY IND OUT	$Z_i \geq$
3		
4	VF VIDEO OUT (G)	GND for VF VIDEO
5	BATT IND OUT	$Z_i \geq 100 \Omega$
6	VF VIDEO OUT (X)	$V=1 \text{ Vp-p}$
7	EXT DC OUT (+12 V)	10.5 V to 17 Vdc 3 A
8	GAIN UP IND OUT	+5 V $Z_i=1 \text{ k}\Omega$

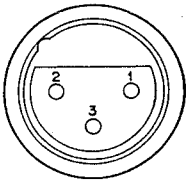
DC (4P, MALE)



(EXT VIEW)

No.	SIGNAL	SPECIFICATION
1	EXT DC IN (G)	GND
2		
3		
4	EXT DC IN (X)	10.5 to 17.0 Vdc

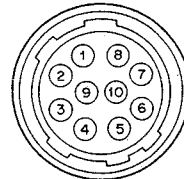
MIC (3P, FEMALE)



(EXT VIEW)

No.	SIGNAL	SPECIFICATION
1	MIC IN (G)	GND for MIC
2	MIC IN (X)	-60 dBm $Z_i \leq 600 \Omega$
3	MIC IN (Y)	BALANCED (Phantom: 48 V \pm 4 V)

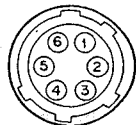
REMOTE (10P, FEMALE)



(EXT VIEW)

No.	SIGNAL	SPECIFICATION
1	PAN CONT OUT	0 to 5 V
2	VIDEO (REMOTE) OUT (X)	$Z_i \geq 10 \text{ k}\Omega$ 4.5 \pm 0.5 Vdc 0+0.5 Vdc
3	VIDEO (REMOTE) OUT (G)	GND for VIDEO
4	TILT CONT OUT	0 to 5 V
5	VTR START STOP TRIG IN	$Z_i \geq 10 \text{ k}\Omega$ — OPEN (4.5 \pm 0.5 V) — 0+0.5 V
6	S DATA (REMOTE)	0 to 5 V $Z_i \geq 10 \text{ k}\Omega$
7	ON/OFF CONT OUT	ON: +5 V OFF: 0 V
8	REC TALLY IND OUT	$Z_i \geq 600 \Omega$
9	EXT DC OUT (G)	GND for +12 V
10	EXT DC OUT (+12 V)	10.5 to 17.0 Vdc 3A

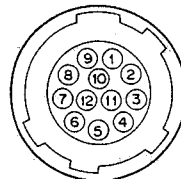
LENS REMOTE (6P, FEMALE)





(EXT VIEW)

No.	SIGNAL	SPECIFICATION
1	+2.5 V OUT	$+2.5 \pm 0.1$ Vdc
2	CCU/VTR OUT	CCU: VTR:
3	EXT DC OUT (G)	GND for +12 V
4	ZOOM CONT OUT	$Z_i \geq 10$ k Ω 0 to 5 V
5	FOCUS CONT OUT	$Z_i \geq 10$ k Ω 0 to 5 V
6	EXT DC OUT (+12 V)	10.5 to 17.0Vdc 3A

LENS (12P, FEMALE)



(EXT VIEW)

No.	SIGNAL	SPECIFICATION
1	VF VIDEO EN IN	ON: $0+0.5$ V OFF: OPEN $Z_i \geq 10$ k Ω
2	VTR START • STOP TRIG IN 	$Z_i \geq 10$ k Ω  OPEN (4.5 ± 0.5 V) 0+0.5 V
3	EXT DC OUT (G)	GND for +12 V
4	IRIS CLOSE OUT	AUTO: 4.5 ± 0.5 V MANU: $0+0.5$ V or OPEN $Z_o \leq 1$ k Ω
5	IRIS CONT OUT	2 to 8 V "3.4 V (F16), 6.2 V (F2.8)" $Z_o \leq 1$ k Ω
6	EXT DC OUT (+12 V)	10.6 to 17.0 Vdc
7	LENS IRIS POSI IN	2 to 8 V "3.4 V (F16), 6.2 V (F2.8)" $Z_i \geq 10$ k Ω
8	REMOTE/LOCAL OUT	: $0+0.5$ V : 4.5 ± 0.5 V $Z_o \leq 1$ k Ω
9		
10		
11		
12		

2-4-2. Connections

When each connector is connected to a cable,
use the connector listed below or equivalent.

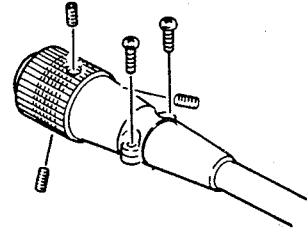
Connector Name	Connector of Cable to be connected
CCZ	1-564-184-00 CONNECTOR, 26 P, FEMALE <ul style="list-style-type: none"> • For 10 P-VTR use CCZJ-2 (2 m) CCZJ-5 (5 m) • For 14 P-VTR use CCZQ-A2 (2 m) CCZQ-A5 (5 m) CCZQ-A10 (10 m) • For 26 P-VTR use CCZ-A2 (2 m) CCZ-A5 (5 m) CCZ-A10 (10 m) • For 14 P-CCU use CCZQ-A2AM (2 m) • For 26 P-CCU use CCZ-A25 (25 m) A50 (50 m) A100 (100 m) (26 P, MALE)
VF (8 P, FEMALE)	1-560-247-00 CONNECTOR, 8 P, MALE
MIC (3 P, FEMALE)	1-516-125-00 XLR-3 P, MALE Canon XLR-3-12 C equality
DC (4 P, MALE)	1-506-261-00 XLR-4 P, FEMALE 1-551-969-00 CORD, with CONNECTOR
REMOTE (10 P, FEMALE)	1-506-522-11 PLUG, CONNECTOR, ROUND 10 P, MALE HIROSE HR10 A-10 P-10 P equality
LENS REMOTE (6 P, FEMALE)	1-566-365-11 PLUG, CONNECTOR, ROUND 6 P, MALE HIROSE HR10 A-7 P-6 P equality

Connector Name	Connector of Cable to be connected
LENS (12 P, FEMALE)	1-564-360-11 PLUG, CONNECTOR, ROUND, 12 P, MALE HIROSE HR10-10 PA-12 P equality
VIDEO OUT GENLOCK (BNC)	1-560-069-11 PLUG, BNC

2-4-3. Disconnection of CCZ/CCZJ/CCZQ Connectors

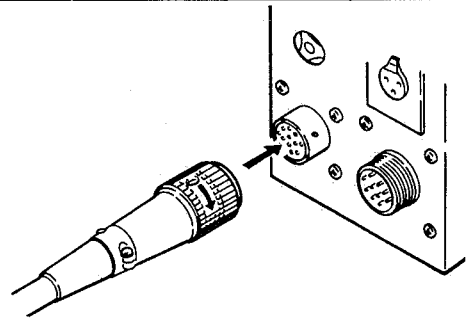
Step 1.

Remove the three hexagonal setscrews and the two (+) set screws.



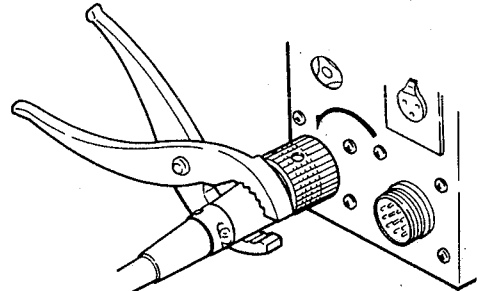
Step 2.

Fix the CCZ/CCZJ/CCZQ connectors at the camera adaptor or VTR connector.



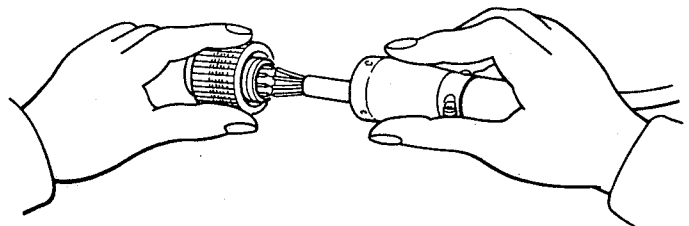
Step 3.

Rotate the CCZ/CCZJ/CCZQ connectors to counter-clockwise by the plier and loosen it.



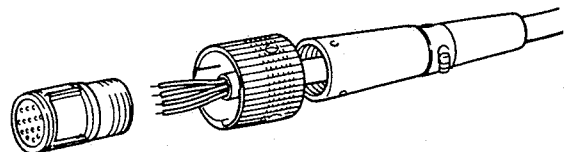
Step 4.

It can be removed by hand and unsolder.



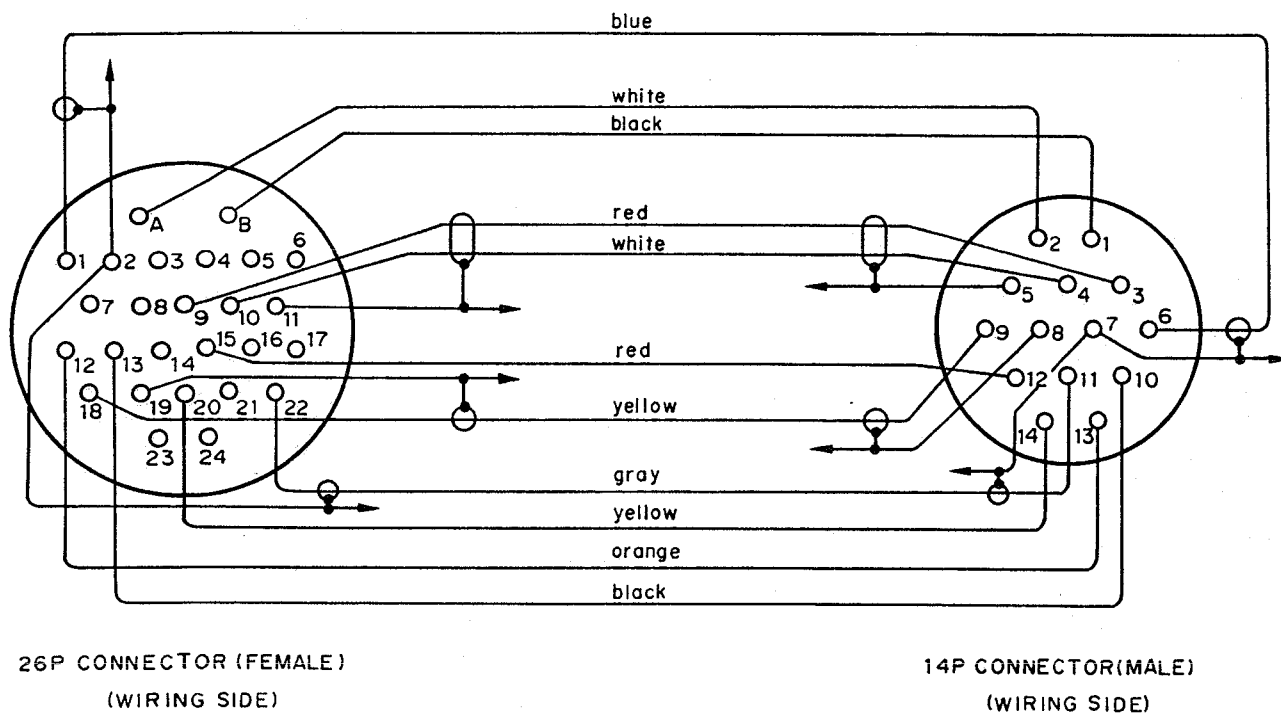
Step 5.

It can be broken up as shown in Figure.

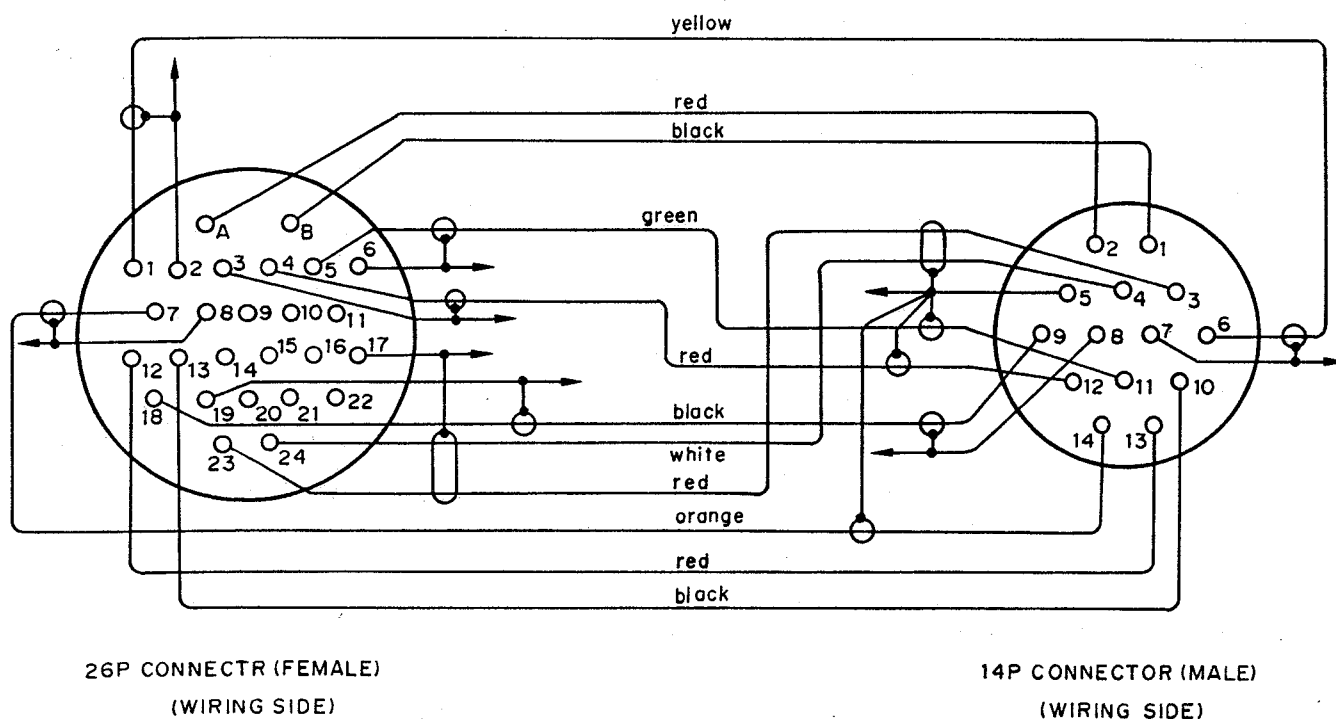


2-4-4. Cable Wiring

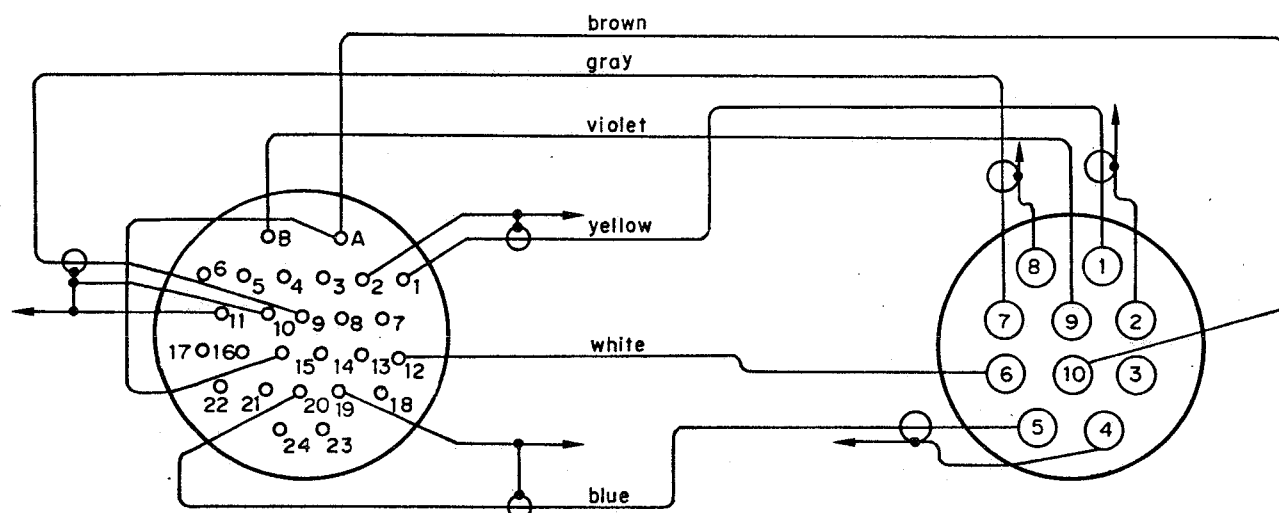
CCZQ-An cable (Wiring diagram)



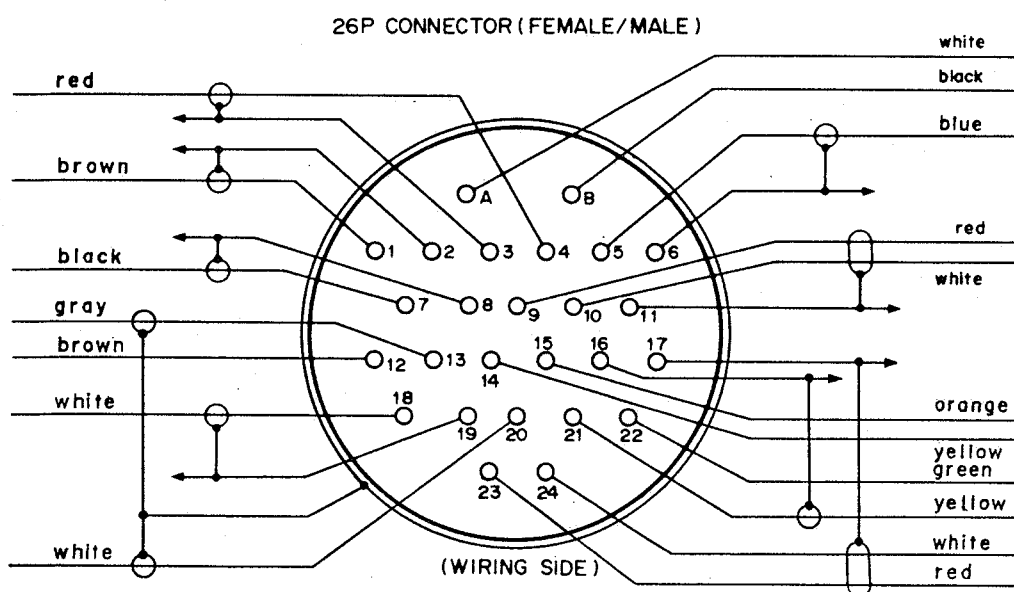
CCZQ-AnAM cable (Wiring diagram)



CCZJ cable (Wiring diagram)



CCZ-An cable (Wiring diagram)



2-5. INTERNAL SWITCH SETTINGS

AT-46 board

. S1 (WARNING DISP AND U/D CTL)

When this switch is set to [OPE/A], the following items can be adjusted using the UP/DOWN switches on the front of the video camera.

(For the procedures for setting the following items, see the section "check and change of switches" in the General Description in Chapter 1.)

AUTO IRIS OVERRIDE

KNEE POINT (Switchable to three points)

MAS PED

SHUTTER SPEED

The AWB/ABB adjustment is not complete, the cause is displayed on the viewfinder screen. Table 1-2 shows the possible causes which are displayed.

When this switch is set to [FULL/B], the following items, in addition to the preceding items, can be adjusted using the UP/DOWN switches on the front of the video camera.

Illustration 1-1 shows the adjustment procedure.

R GAIN M GAMMA

B GAIN R GAMMA

R PED B GAMMA

B PED DTL LEVEL

KNEE POINT (for fine setting)

Table 1-1 shows the conditions and ranges of adjustment for these items. If the AWB/ABB adjustment is not complete, the cause is displayed on the viewfinder screen.

Table 1-2 shows the possible causes which are displayed.

Normally, set this switch to [OPE/A].

* The adjusted values set with the UP/DOWN switches can be stored in memory using S3 (SETUP). To store the settings, see the section on the setting of S3 (SETUP).

Adjustment procedure

Viewfinder screen

A. IRIS: -0.5
KNEE : MAX
M. PED : -6
SHUTTER: OFF

Blinks

Set the STATUS/FUNC switch to FUNC.

R GAIN: 28
B GAIN: -50
R PED : -02

Blinks

While the R GAIN display is blinking, R GAIN can be adjusted with the UP/DOWN switches.

R GAIN: 28
B GAIN: -50
R PED : -20
B PED : 01

Blinks

While the B GAIN display is blinking, B GAIN can be adjusted with the UP/DOWN switches.

The other items can be adjusted by setting the STATUS/FUNC switch to FUNC in the manner described above.

In this mode, the order of the items to be adjusted is reversed by setting the STATUS/FUNC switch to STATUS.

Illustration 1-1

The conditions and ranges of adjustment which can be set by the UP/DOWN switches

Items	Conditions	When -99 is displayed	When 00 is displayed	When +99 is displayed
R GAIN B GAIN	WHITE AUTO	Approx. -4dB	PRESET	Approx. +4dB
R PED B PED	Not specified	Approx. -30IRE	PRESET	Approx. +30IR
M GAMMA R GAMMA B GAMMA	Not specified	Approx. 0.5 (Cross point: approx. -3.5IRE)	PRESET (Approx. 0.45)	Approx. 0.4 (Cross point: approx. +3.5IRE)
		Cross point: approx. -2.0IRE	PRESET	Cross point: approx. +2.0IE
DETAIL	Not specified	OFF	PRESET	+4dB
KNEE POINT	DCC OFF	Approx. 110IRE	PRESET	Approx. 85IRE

Table 1-1

The display when the AWB/ABB adjustment is not complete

When set to [OPE/A]		When set to [FULL/B]	
Viewfinder screen	Cause	Viewfinder screen	Cause
AUTO WHITE - NG - :LOW LIGHT CHG. FILTER TRY AGAIN	Cause: Auto white balance cannot be adjusted because of LOW LIGHT.	AUTO WHITE - NG - :CIRCUIT NG? <input type="checkbox"/> GAIN DET TRY AGAIN	Display: R in <input type="checkbox"/> means R GAIN B in <input type="checkbox"/> means B GAIN Cause: The error voltage data of R-G/B-G has already been set within ± 1 bit. However, the polarity of the error voltage did not change even though the control data was changed by ± 1 bit. Ex. The error voltage of R-G/B-G is always 0V because of an open circuit in the sample-and-hold circuit.
AUTO WHITE - NG - :C. TEMP. LOW CHG. FILTER TRY AGAIN	Cause: Because the color temperature is too high or too low, the control data has not been set between $\phi\phi$ and FF while the error voltage of R-G/B-G was changing during adjustment.		
AUTO WHITE - NG - :C. TEMP. HI CHG. FILTER TRY AGAIN			
AUTO WHITE - NG - ??	To display the cause, set S1 to [FULL/B].	AUTO WHITE - NG - :CIRCUIT NG? <input type="checkbox"/> GAIN CTL TRY AGAIN	Display: R in <input type="checkbox"/> means R GAIN B in <input type="checkbox"/> means B GAIN Cause: The error voltage of R-G/B-G has not yet been set within ± 1 bit, and the error voltage did not change even though the control voltage was changed. Ex. A defect in the GAIN control system of R-ch/B-ch
AUTO BLACK - NG - :IRIS NOT CLOSED TRY AGAIN	Cause: The video level of G-ch did not drop to the proper level because: . The lens connector is disconnected. . The iris closing mechanism of the lens does not work.		
AUTO BLACK - NG - ??	To display the cause, set S1 to [FULL/B].	AUTO BLACK - NG - :CIRCUIT NG? <input type="checkbox"/> B. BAL DET TRY AGAIN	Display: R in <input type="checkbox"/> means R GAIN B in <input type="checkbox"/> means B GAIN Cause: The error voltage of R-G/B-G has already been set within ± 1 bit. However, the polarity of the error voltage did not change even though the control voltage data was changed by ± 1 bit. Ex. An open circuit in the sample-and-hold circuit, or others

Table 1-2



When set to [FULL/B]	
Viewfinder screen	Cause
AUTO BLACK - NG - :CIRCUIT NG? <input type="checkbox"/> B. SET DET TRY AGAIN	Display: R in <input type="checkbox"/> means R-ch B in <input type="checkbox"/> means B-ch G in <input type="checkbox"/> means G-ch Cause: The difference in the black level was between 0dB and 18dB of GAIN, but the difference in the black level did not change by the control data used for the adjustment. Ex. A defect in the sample-and-hold circuit, or others.
AUTO BLACK - NG - :CIRCUIT NG? <input type="checkbox"/> ADJ TRY AGAIN	Display: RB, SET in <input type="checkbox"/> means R-ch BB, SET in <input type="checkbox"/> means B-ch GB, SET in <input type="checkbox"/> means G-ch Out of the adjustable range for AUTO BLACK SET RB, BAL in <input type="checkbox"/> means R-ch BB, BAL in <input type="checkbox"/> means B-ch Out of adjustable range for AUTO BLACK BALANCE Ex. The adjusted value is very different because of a defect in the control system.
AUTO BLACK - NG - :CIRCUIT NG? <input type="checkbox"/> CTL TRY AGAIN	Display: RB, SET in <input type="checkbox"/> means R-ch BB, SET in <input type="checkbox"/> means B-ch GB, SET in <input type="checkbox"/> means G-ch Cause: The error voltage data did not come to within ± 1 bit even though the control voltage was changed. Display: RB, BAL in <input type="checkbox"/> means R-ch BB, BAL in <input type="checkbox"/> means B-ch Ex. A defect in the control system.

(Table 1-2)

. S2 (TEST)

This switch is to be used to check and adjust the circuits in the video signal system. Setting this switch to ON outputs the TEST SAW signal as the video signal.

When a CCU or RM is connected, this switch is disabled and the TEST SAW signal can be turned on or off from the connected CCU or RM.

Normally, set this switch to OFF.

. S3 (SETUP)

Setting this switch to ON stores the following items in memory. These items must be adjusted by the camera unit, CCU, or RM before setting this switch to ON.

The stored values can be retrieved and used to control the settings of the video camera.

AUTO WHITE

AUTO BLACK

R, B GAIN

M PED

R, B PED

M GAMMA

R, B GAMMA

DTL LEVEL

KNEE POINT

Setting this switch to OFF stores the following items in memory. The data for the other items cannot be stored. The stored values can be retrieved and used to control the settings of the video camera.

AUTO WHITE

AUTO BLACK

No data can be stored in memory by setting this switch to ADJ.

All data that has been stored in memory will be reset to the preset values when power is turned on.

In this condition, the AUTO WHITE and AUTO BLACK functions are disabled. (ADJ is displayed on the viewfinder screen.)

Normally, set this switch to OFF.

DXC-M7 (UC)

DXC-M7P (EK)

DXC-M7PM (BRZ)

Illustration 1-2 shows how to store the values of the adjusted items, shown in Table 1-1, in memory. (The procedure is the same when the values are to be stored in memory using a CCU or RM)

Illustration 1-3 shows how to reset the stored values to their preset values by deleting all the data stored in memory.

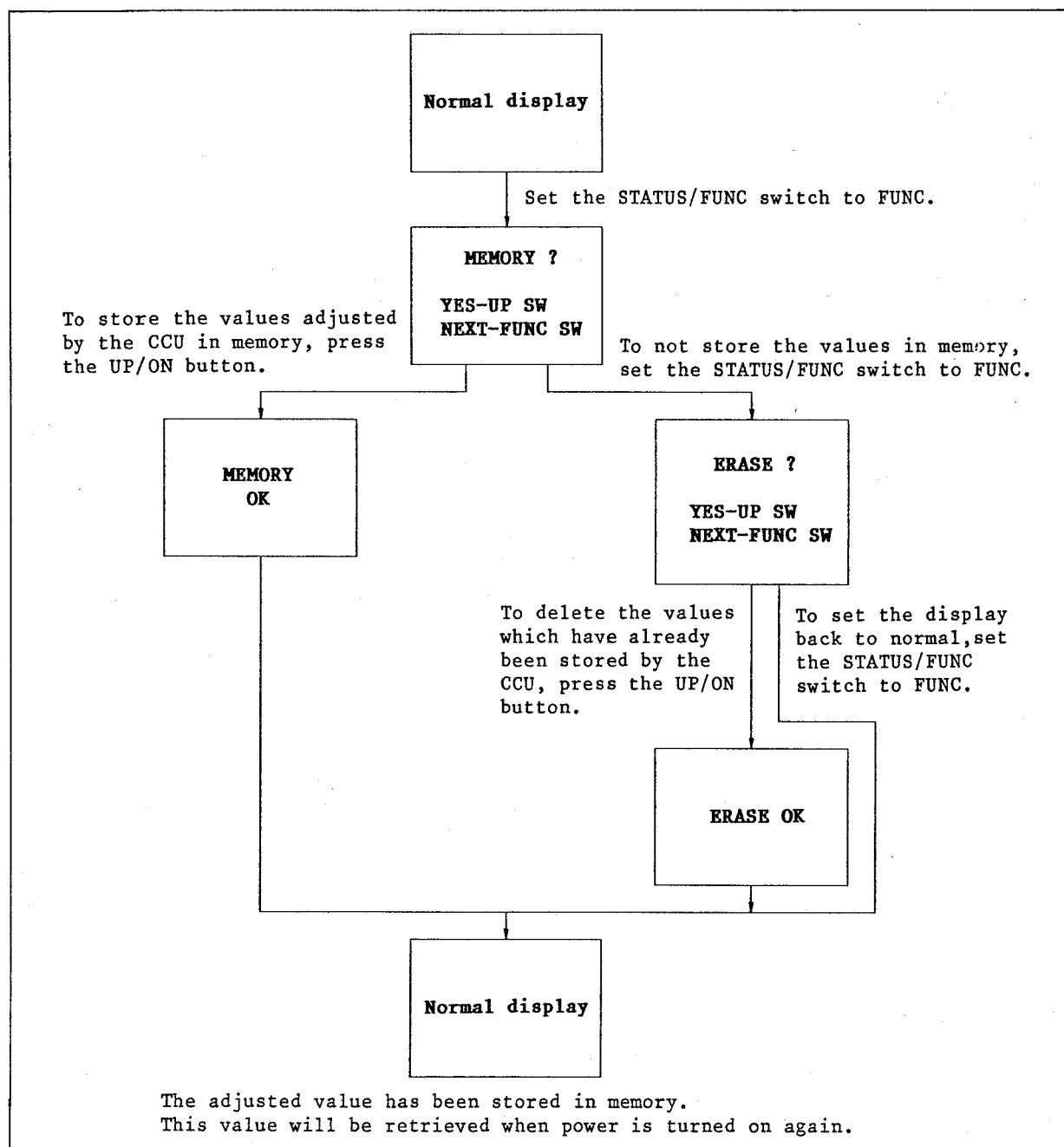


Illustration 1-2

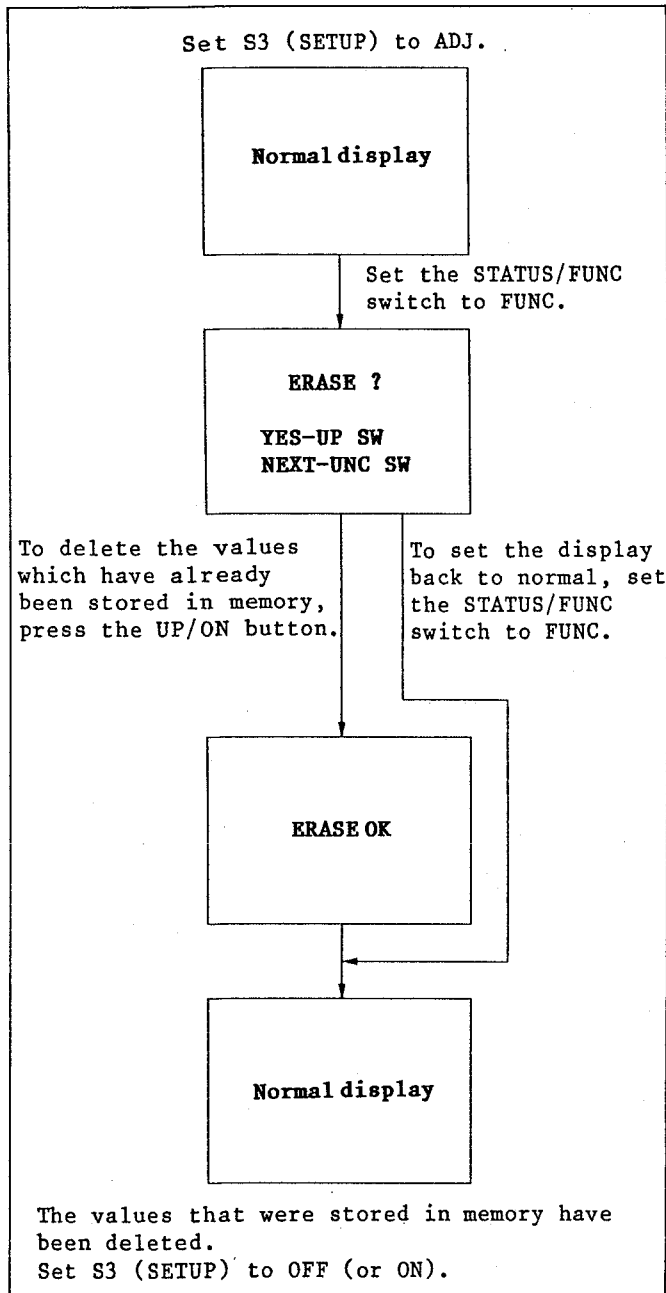


Illustration 1-3

EN-53 board

. S1 (MODE)

This switch is used to select the signal at the VIDEO OUT connector.

By setting this switch to ENC, the encoded signal (VBS) consisting of R, G, and B signals will be output. If this switch is set to MONI, the signal selected by S2 (MONITOR) will be output.

Normally, set this switch to ENC.

. S2 (MONITOR)

This switch is used to select the signal at the VIDEO OUT connector when S1 (MODE) is set to MONI.

Setting this switch to R, G, or B outputs the video signal in R-ch, G-ch, or B-ch respectively.

This switch is factory-set to G.

Switch it to the desired position if necessary.

. S3 (VF SELECT)

Turning this switch to COLOR switches the signal sent to the viewfinder from B/W to color.

Normally, set this switch to B/W.

IE-16 board

. S1 (DETAIL)

Setting this switch to ON activates the detail circuit, and the image will be enhanced.

This switch is factory-set to ON.

Set it to the appropriate position if necessary.

IF-142 board**. S1 (OUTPUT)**

This switch is used to select the signal output at the 26-pin connector of the video camera.

R, G, and B signals are output if this switch is set to RGB. If it is set to AUTO, the signal, which is either component signal, RGB signal, or Y/C separate signal, will be automatically selected by the unit connected to the 26-pin connector of the video camera.

When a CCU is not connected, the component signal will be output.

When a CCU-M3 is connected, the RGB signal will be output.

When a CCU-M7 is connected, any of the three signals can be selected for output using the video signal selector on the rear panel of the CCU-M7. If it is set to Y/C, the Y/C signal will be output.

Normally, set this switch to AUTO.

. S2 (VTR)

This switch is used to adjust the function of the video camera to that of the unit connected to the 26-pin connector of the video camera.

If this switch is set to CCU1 and the connected unit is a Betacam VTR, the component signal will be output. If the connected unit is a Umatic VTR, a composite video signal will be output.

Whenever a CCU, Betacam VTR, or Umatic VTR is connected, set this switch to this position.

If this switch is set to 2, a composite video signal will be output from the 26-pin connector of the video camera.

Set to this position when a VHS-VTR is connected.

If this switch is set to 3, Y/C separate signal will be output from the 26-pin connector of the video camera. Set the switch to this position when a VTR which has a Y/C video input connector such as an S VHS-VTR is connected.

This switch is factory-set to CCU-1.

Set it to the appropriate position if necessary.

PR-90 board**. S1 (MASK)**

Setting this switch to ON enables the linear matrix circuits.

This switch is factory-set to OFF.

Set it to ON if necessary.

. S2 (GAMMA)

Setting this switch to ON enables the gamma correction circuits, and the gamma of the signals will be corrected.

Normally, set this switch to ON.

PS-141 board

. S1 (SC)

This switch is used when adjusting the phase of the subcarrier in the video signal, which is being output from this video camera, to the externally supplied reference signal when the video camera is used in the external sync lock mode. Turning this switch when the video camera is used in the external sync lock mode inverts the phase of the subcarrier.

This switch is factory-set to 0 degree.

. S2 (ZEBRA)

Turning this switch to ON displays a zebra pattern on the viewfinder screen where the image level is 70IRE.

Refer to this pattern when adjusting the iris manually. If this switch is set to OFF, the zebra pattern does not appear.

Normally, set this switch to ON.

TG-32 board

. S1 (FD/FM/FMR)

This switch is used for setting the reading sequence of the electron charges (video signal) output from the CCD photo sensors.

If it is set to FD, the signal in a field will be read two lines by two lines.

If it is set to FM, the signal in a frame is read line by line.

If it is set to FMR, the signal in a field is read line by line.

This switch is factory-set to FD.

Set it to the appropriate position if necessary.

2-6. NOTES ON SERVICING

(1) When replacing the front unit assembly, be sure to replace the ROM IC (supplied with the CCD block) together with the unit.

(2) When replacing the TG-32 board on which the ROM IC (MB7053 or MB7116H) is mounted, be sure to remove the ROM from the old TG-32 board you have detached and then mount it on the new TG-32 board.

(3) Never detach the PA-61, PA-62, and PA-63 boards on which CCDs are mounted, nor the NR-22 and HN-94 boards.

Do not adjust the potentiometers on these boards as their adjustment is very critical. Leave their adjustment as they are set at factory.

If the CCD or CCDs are defective or damaged and, therefore, the PA/NR/HN board or boards have to be replaced, replace the front unit assembly instead of replacing each part.

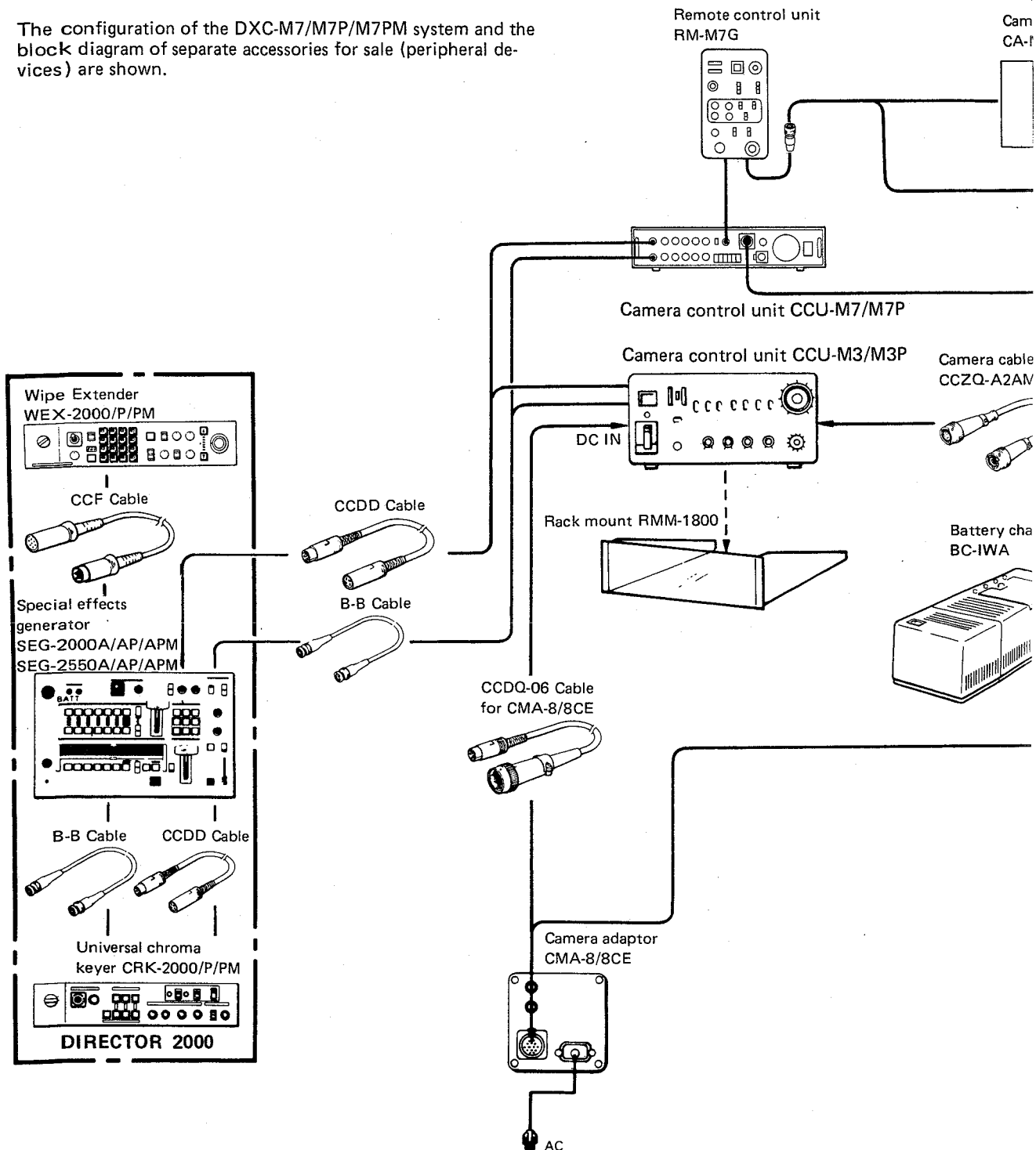
(4) When ROM IC (IC15: MBM27C64-25-DXCM7100) mounted on AT-46 board is replaced, remove it together with IC12 (HD6305Y0) and mount a new IC (HD6305Y0C92P).

The new IC is a mask ROM.

(Serial No. 10001 - 10400)

2-7. SYSTEM BLOCK DIAGRAM

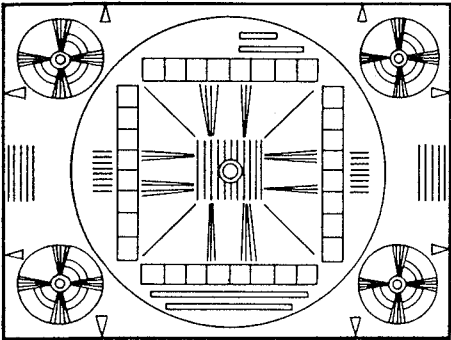
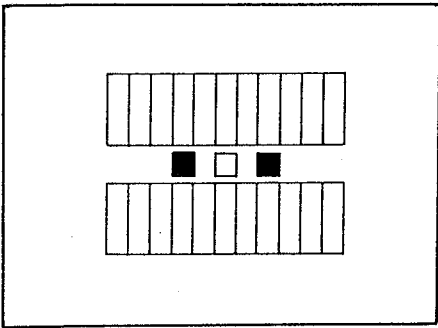
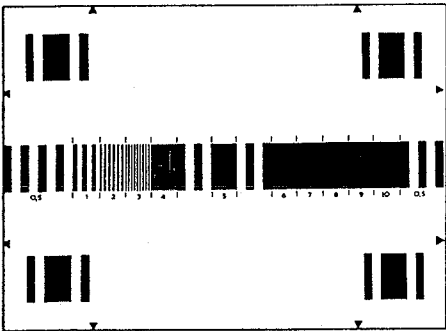
The configuration of the DXC-M7/M7P/M7PM system and the block diagram of separate accessories for sale (peripheral devices) are shown.

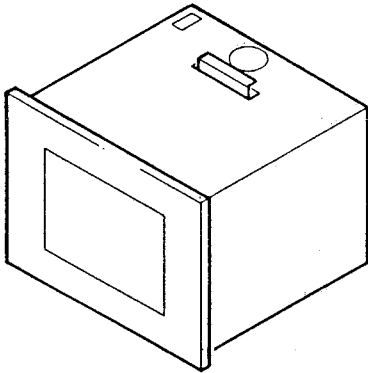
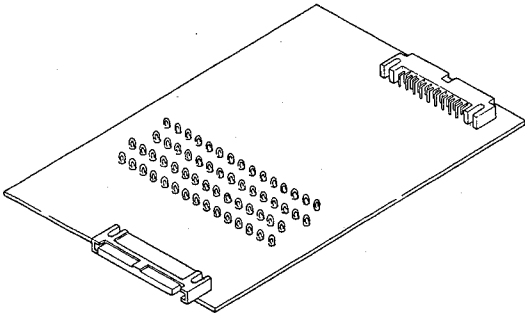
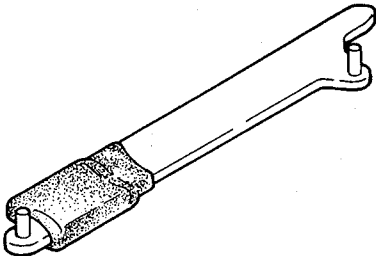


SECTION 3 ALIGNMENT

3-1. PREPARATION

3-1-1. Equipment Required

J-6026-100-A	Resolution chart
	
J-6026-130-A	Grayscale chart
Paste black velvet on the both sides of the white section at the center so that it becomes opaque.	
	
J-6026-110-A	Multiburst chart
	

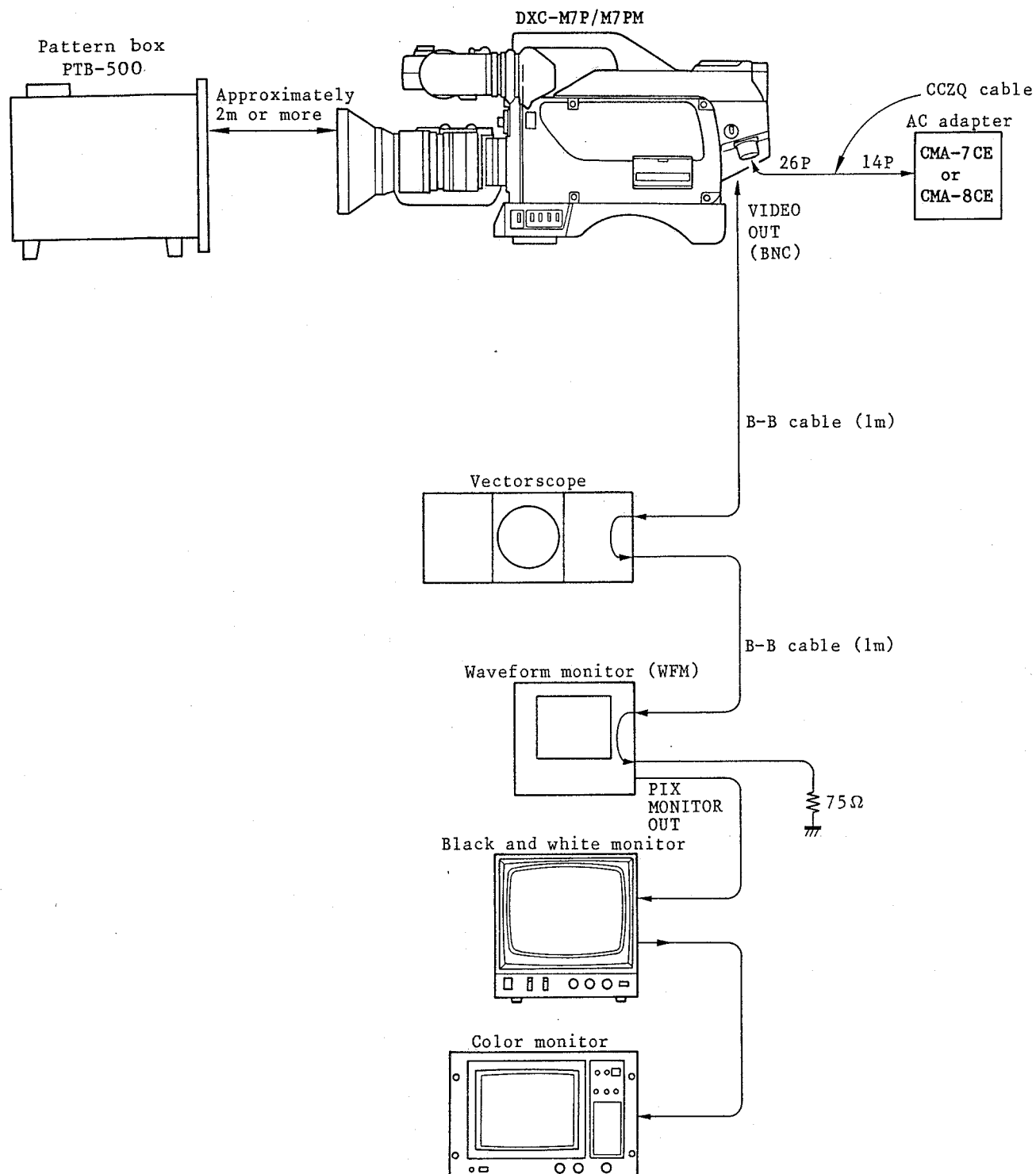
J-6029-140-A	Pattern box PTB-500 (90 to 240VAC) Color bar chart attached
	
J-6302-620-A	Extension board (EX-125)
	
	Jigs for extracting boards
	

- . AC adapter (Sony CMA-7CE or CMA-8CE)
- . CF pulse generator (Sony BVG-10P/PM or equivalent) or TEKTRONIX 1750 series
- . Low-frequency signal generator
(1kHz, 0.8mVp-p, sinewave)
- . Code with plug
(Sony parts number 1-557-039-00)

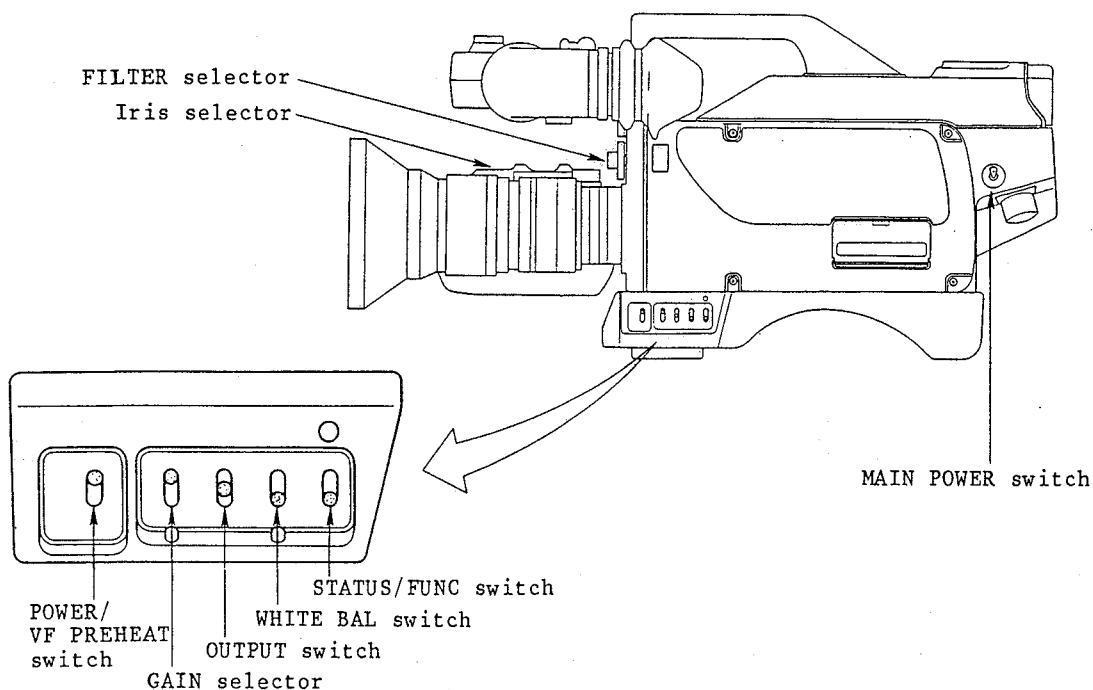
Measuring instruments

- . Oscilloscope
- . Waveform monitor
- . Vectorscope
- . Frequency counter
- . Digital voltmeter
- . Black and white monitor
(horizontal resolution: At least 700 lines)

3-1-2. Connections



3-1-3. Initial Setting



1. Before adjustment, set the MAIN POWER switch and POWER/VF PREHEAT switch on the side of the camera to ON to allow it to warm up.
2. Set the switches and selectors on the camera as follows.

[External]

MAIN POWER switch	: ON
POWER/VF PREHEAT switch	: ON
OUTPUT switch	: CAM/DCC OFF
GAIN selector	: 0dB
WHT BAL switch	: PRESET
FILTER selector	: 1 (3200°K)
Iris selector	: MANU
Lens iris	: CLOSE (C)

[PR-90 board]

S1 **MASK** : OFF

[EN-53 board]

S3 (COLOR/BW): B/W

[IE-16 board]

S1 **DETAIL** : OFF

[PS-141 board]

S2 **ZEBRA** : OFF

[AT-46 board]

S3 **SET UP** : ADJ

3-1-4. Notes on Adjustment

. When an extension board is used

Be sure to set the POWER/VF PREHEAT switch on the side of the camera to VF PREHEAT when extracting or restoring any of the following boards:

VA-46 board, BG-120 board

IE-16 board, AT-46 board

PR-80 board, IF-142 board

EN-53 board

When extracting the PS-141 board from the camera, or restoring it, be sure to set the MAIN POWER switch on the side of the camera to OFF.


Some parts mounted on the AT-46 board may protrude from the board (IC20 to IC22).

When extracting the AT-46 board from the camera or restoring it, be sure to extract the PS-141 board with the MAIN POWER switch on the side of the camera set to OFF.

. Notes on S3 SET UP /AT-46 board

During adjustment, set the S3 SET UP switch to ADJ. When camera adjustment is completed, be sure to set the SET UP switch to either ON or OFF.

S3 SET UP /AT-46 board

ADJ: Set S3 to this position during  camera adjustment.

ON or OFF: Set S3 to either ON or OFF during normal use of the camera.

. Notes on partial adjustment

Section 3-2 "OVERALL ADJUSTMENT" describes the procedure for the overall adjustment. For performing partial adjustment, see Section 3-3.

. Notes on variable register adjustment

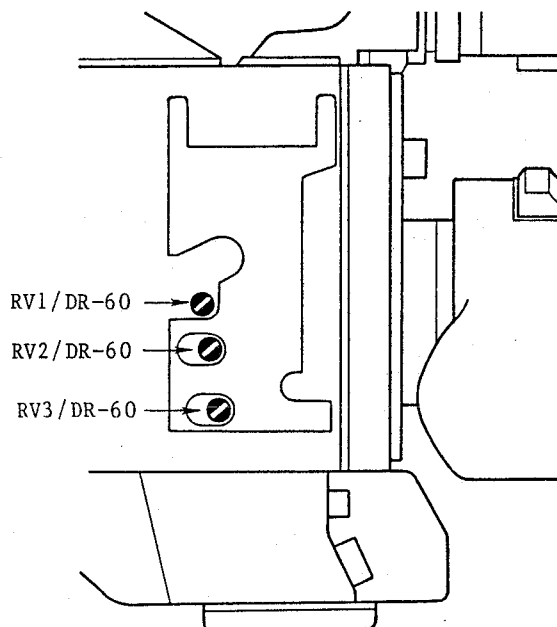
The following variable registers are very difficult to adjust. Be careful not to change their positions.

● CV1/IE-16 board

● RV1/DR-60 board

● RV2/DR-60 board

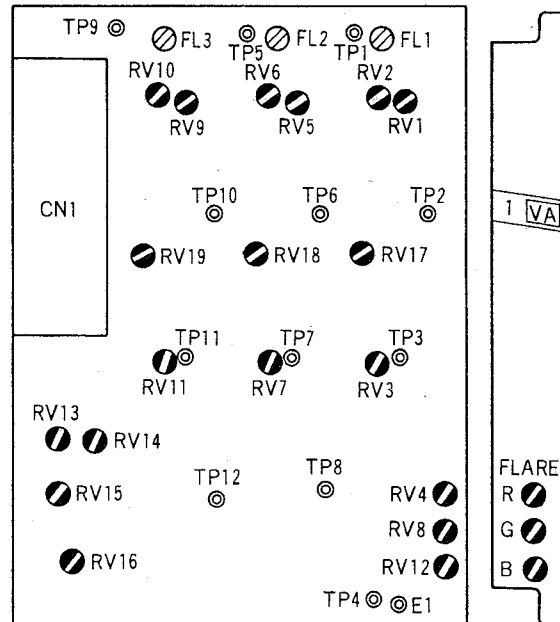
● RV3/DR-60 board



3-1-5. Names of Switches and Selectors on Each Board and Their Arrangement

1) VA-46 BOARD

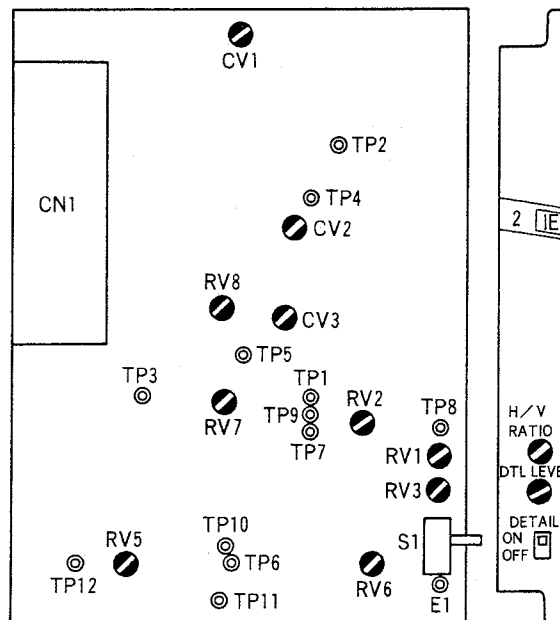
- RV1 (R TEST SAW)
- RV2 (R LEVEL 1)
- RV3 (R LEVEL 2)
- RV4 **R FLARE**
- RV5 (G TEST SAW)
- RV6 (G LEVEL 1)
- RV7 (G LEVEL 2)
- RV8 **G FLARE**
- RV9 (B TEST SAW)
- RV10 (B LEVEL 1)
- RV11 (B LEVEL 2)
- RV12 **B FLARE**
- RV13 (KNEE POINT LOW LIMIT)
- RV14 (B KNEE POINT)
- RV15 (R KNEE POINT)
- RV16 (DCC KNEE POINT)
- RV17 (R OFFSET)
- RV18 (G OFFSET)
- RV19 (B OFFSET)



VA-46 BOARD (COMPONENT SIDE)

2) IE-16 BOARD

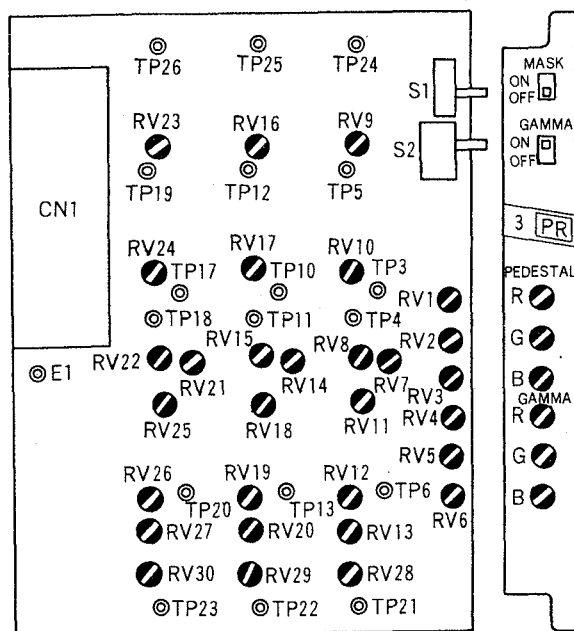
- CV1 (0H FREQ RESP)
- CV2 (1H FREQ RESP)
- CV3 (2H FREQ RESP)
- RV1 **H/V RATIO**
- RV2 (CRISPENING)
- RV3 **DTL LEVEL**
- RV5 (HF LEVEL)
- RV6 (HF OFFSET)
- RV7 (G(1H) OUT LEVEL)
- RV8 (G(1H) OUT LEVEL)
- S1 **DETAIL** switch



IE-16 BOARD (COMPONENT SIDE)

3) PR-90 BOARD

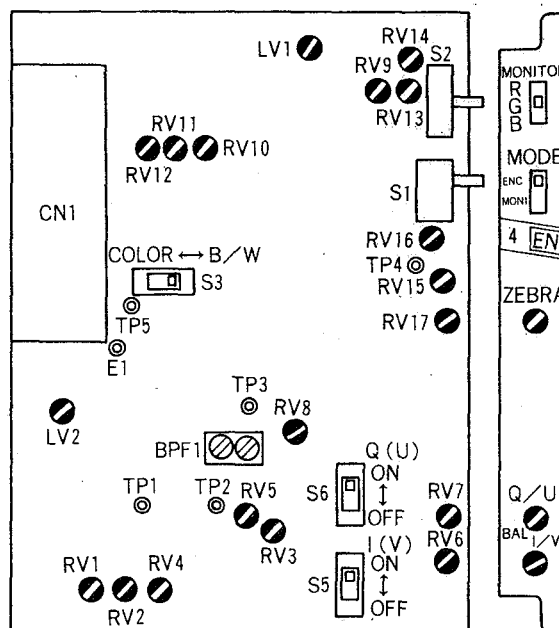
RV1	R PED	RV17	(G 7 SET 1)
RV2	G PED	RV18	(G 7 SET 2)
RV3	B PED	RV19	(G LEVEL)
RV4	R GAMMA	RV20	(G KNEE)
RV5	G GAMMA	RV21	(R-B MASK)
RV6	B GAMMA	RV22	(G-B MASK)
RV7	(G-R MASK)	RV23	(B 7 1 GAIN)
RV8	(B-R MASK)	RV24	(B 7 SET 1)
RV9	(R 7 1 GAIN)	RV25	(B 7 SET 2)
RV10	(R 7 SET 1)	RV26	(B LEVEL)
RV11	(R 7 SET 2)	RV27	(B KNEE)
RV12	(R LEVEL)	RV28	(R WHT CLIP)
RV13	(R KNEE)	RV29	(G WHT CLIP)
RV14	(R-G MASK)	RV30	(B WHT CLIP)
RV15	(B-G MASK)	S1	MASK switch
RV16	(G 7 1 GAIN)	S2	GAMMA switch



PR-90 BOARD (COMPONENT SIDE)

4) EN-53 BOARD

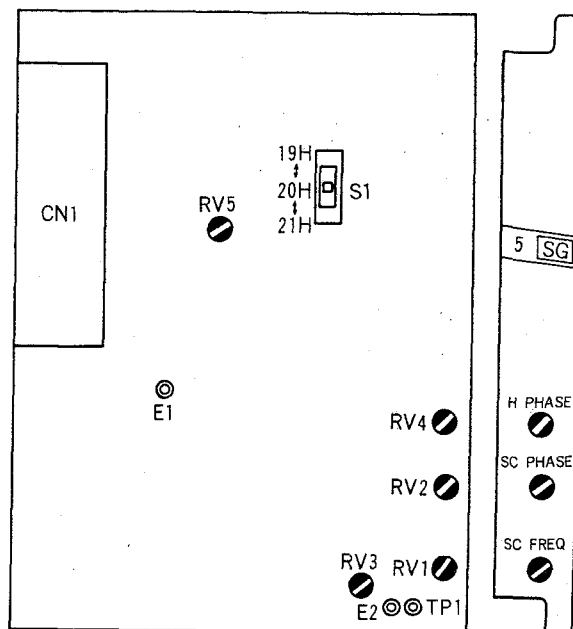
- LV1 (SYNC SET)
- LV2 (SC 90° ADJ)
- RV1 (BURST WIDTH 1)
- RV2 (BURST WIDTH 2)
- RV3 (BURST PHASE)
- RV4 (BURST LEVEL)
- RV5 (Q(U) LEVEL)
- RV6 ☐ I(V) BAL
- RV7 ☐ Q(U) BAL
- RV8 (CHROMA LEVEL)
- RV9 (WHITE LEVEL)
- RV10 (R BAR LEVEL)
- RV11 (G BAR LEVEL)
- RV12 (B BAR LEVEL)
- RV13 (SET UP LEVEL)
- RV14 (SYNC LEVEL)
- RV15 (MONITOR OUT LEVEL)
- RV16 (EN Y LEVEL)
- RV17 (ZEBRA LEVEL)
- S1 ☐ MODE switch
- S2 ☐ MONITOR switch
- S3 (COLOR/BW) switch
- S5 ☐ I(V) ON/OFF switch
- S6 ☐ Q(U) ON/OFF switch



EN-53 BOARD (COMPONENT SIDE)

5) SG-120 BOARD

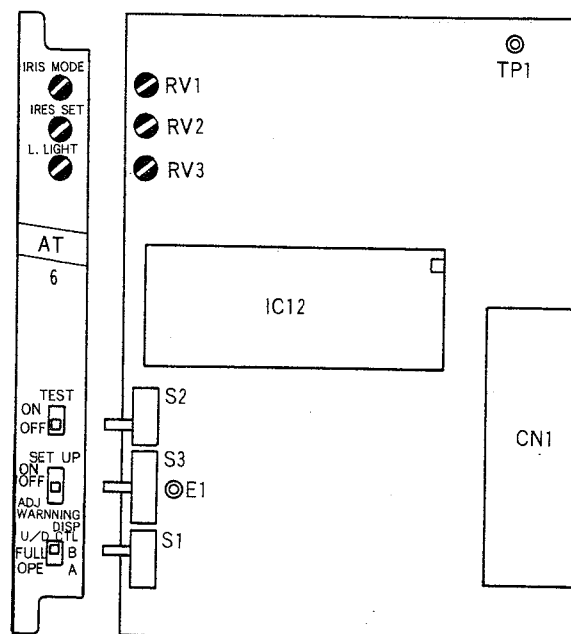
- RV1 ☐ SC FREQ
- RV2 ☐ SC PHASE
- RV3 (INT SC PHASE)
- RV4 ☐ H PHASE
- RV5 (SYNC WIDTH)
- S1 (V BLKG SELECT)



SG-120 BOARD (COMPONENT SIDE)

6) AT-46 BOARD

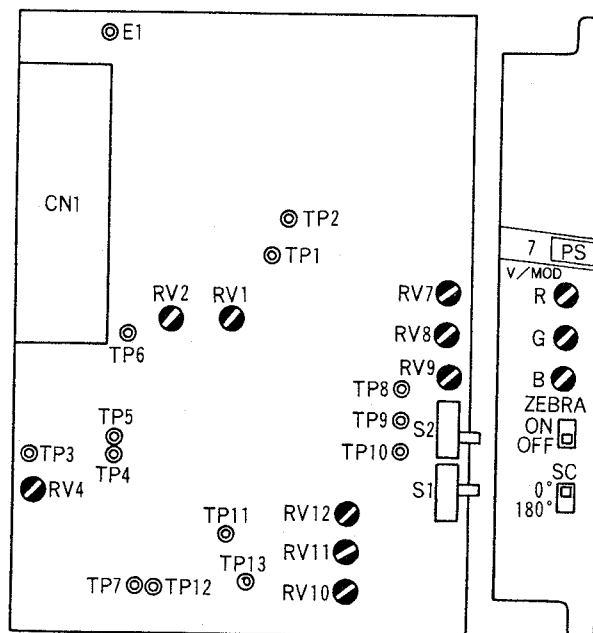
- RV1 IRIS MODE
- RV2 IRIS SET
- RV3 L. LIGHT
- S1 WARNING DISP & U/D CONT switch
- S2 TEST switch
- S3 SET UP switch



AT-46 BOARD (COMPONENT SIDE)

7) PS-141 BOARD

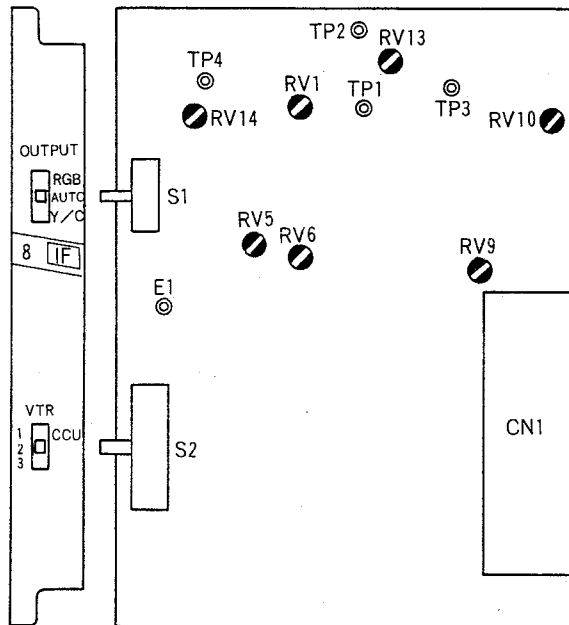
- RV1 (+9.5V ADJ)
- RV2 (+9V ADJ)
- RV4 (BATT ALARM)
- RV7 R V MOD
- RV8 G V MOD
- RV9 B V MOD
- RV10 (R BLACK SET)
- RV11 (G BLACK SET)
- RV12 (B BLACK SET)
- S1 SC 0°/180° switch
- S2 ZEBRA switch



PS-141 BOARD (COMPONENT SIDE)

8) IF-142 BOARD

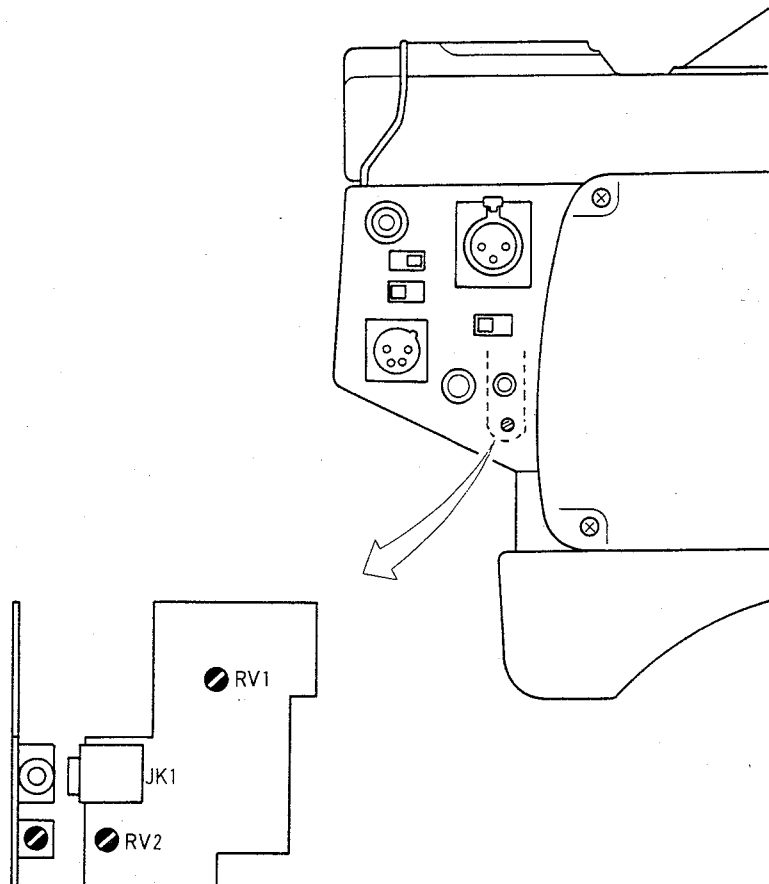
- RV1 (VTR Y LEVEL)
- RV5 (SET UP LEVEL)
- RV6 (SYNC LEVEL)
- RV9 (SEP-ed Y LEVEL)
- RV10 (SEP-ed CHROMA LEVEL)
- RV13 (VTR R-Y LEVEL)
- RV14 (VTR B-Y LEVEL)
- S1 OUTPUT switch
- S2 VTR switch



IF-142 BOARD (COMPONENT SIDE)

9) AA-31 BOARD

- RV1 (SIDE TONE)
- RV2 (INCOM LEVEL)



AA-31 BOARD
(COMPONENT SIDE)

10) TG-32 BOARD

RV1 (SHD π ADJ)

S1 FIELD/FRAME/FRAME RESET switch

11) PA-61 BOARD

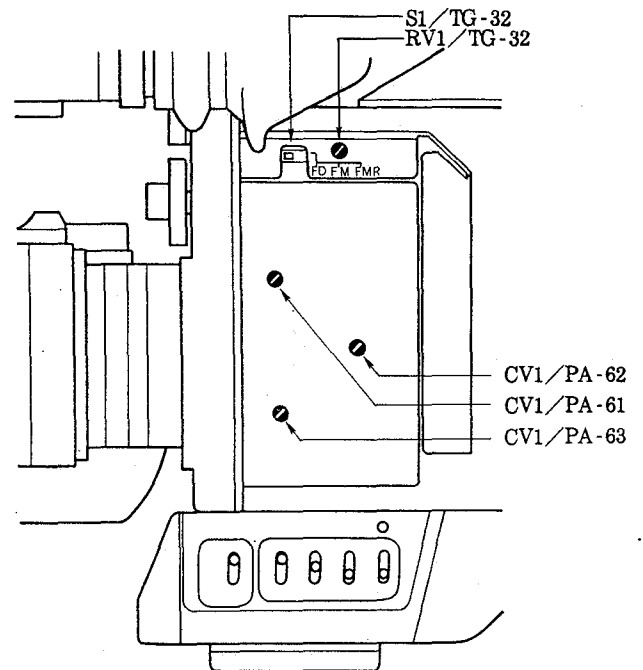
CV1 (B CARRIER BALANCE)

12) PA-62 BOARD

CV1 (G CARRIER BALANCE)

13) PA-63 BOARD

CV1 (R CARRIER BALANCE)



3-1-6. How to Make a Jig

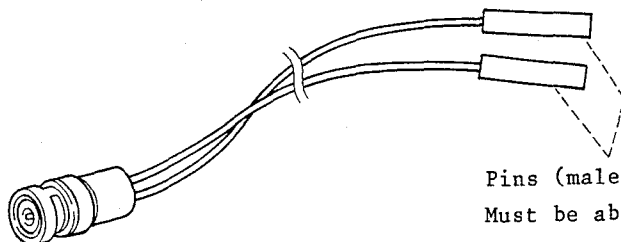
This jig is made according to Step 46, resolution adjustment.

1. Preparation

- . BNC connector (Sony parts number 1-508-898-00)
- . 2 lead wires (The two lead wires must be of different colors so that the signal line and GND line can be distinguished.)
- . 2 male pins (They can be inserted into each pin of the CCZ connector.)

2. Method

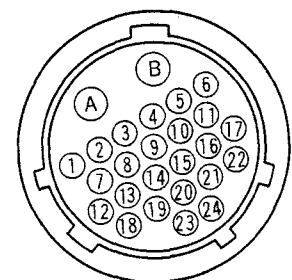
Make the jig referring to the figure below.



Pins (male)

Must be able to be inserted into the male pins of the CCZ connector indicated in the figure at the right.

CCZ connector (male)
- EXT VIEW -



3-2. OVERALL ADJUSTMENT

Power supply system	Step 1: +9.5V/+9V adjustment		Step 36: H/V RATIO adjustment
	Step 2: BATT ALARM adjustment		Step 37: Detail amount adjustment
SYNCH signal system	Step 3: Sub carrier frequency adjustment		Step 38: Zebra level adjustment
	Step 4: SYNC width adjustment		Step 39: SYNC&SET UP level adjustment
	Step 5: SYNC phase adjustment		Step 40: VTR Y level adjustment
	Step 6: Burst flag adjustment	Interface system	Step 41: VTR R-Y level adjustment
	Step 7: V BLKG width adjustment		Step 42: VTR B-Y level adjustment
	Step 8: INT SC phase adjustment		Step 43: SEP-ed Y level adjustment
	Step 9: BARS level adjustment		Step 44: SEP-ed CHROMA level adjustment
	Step 10: EN Y level adjustment		Step 45: Resolution adjustment
Step 11: MONITOR OUT level adjustment	Auto control system	Step 46: Auto iris adjustment	
Step 12: Carrier balance adjustment		Step 47: LOW VIDEO adjustment	
Step 13: Color bar adjustment	Income system	Step 48: SIDE TONE adjustment	
Step 14: Color vector adjustment			
Step 15: PA carrier balance adjustment			
Step 16: VA video level adjustment 1			
Step 17: VA video level adjustment 2			
Step 18: Test waveform level adjustment			
Video signal system	Step 19: G (1H) OUT level adjustment		
	Step 20: G (2H) OUT level adjustment		
	Step 21: 1H-, 2H-, and DELAY-signal phase adjustment		
	Step 22: Gamma set adjustment		
	Step 23: G/B/R offset adjustment		
	Step 24: G/B/R V MOD adjustment		
	Step 25: Black set adjustment		
	Step 26: Pedestal adjustment		
	Step 27: Flare adjustment		
	Step 28: PR output level adjustment		
	Step 29: Gamma correction adjustment		
	Step 30: Manual knee adjustment		
	Step 31: Auto knee adjustment		
	Step 32: White clip adjustment		
	Step 33: Crispening adjustment		
	Step 34: HF offset adjustment		
	Step 35: HF level adjustment		

Step 1. +9.5V/9V adjustment

. Notes

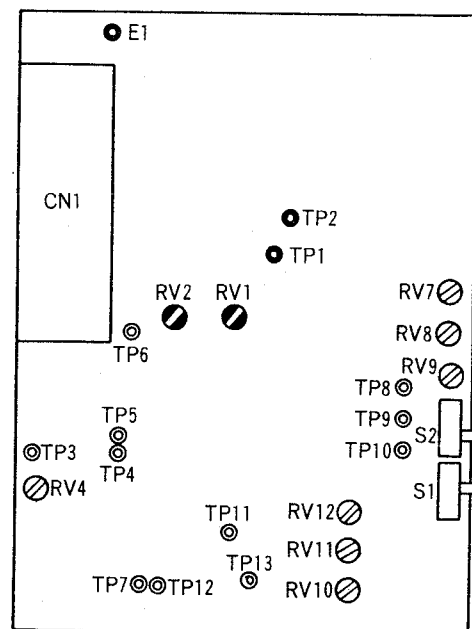
- . If the error is within $\pm 3\%$, this adjustment is not required.
- . If this adjustment has been made, reperform all items of the overall adjustment.

. Setting

Equipment: Digital voltmeter	To be extended: PS-141 board
------------------------------	------------------------------

. Adjustment procedure

	Test point/ PS-141 board	Adjustment point/ PS-141 board	Specification
+9.5V adjustment	TP1 (GND: E1)	RV1	$+9.5 \pm 0.01 \text{Vdc}$
+9V adjustment	TP2 (GND: E1)	RV2	$+9.0 \pm 0.01 \text{Vdc}$



PS-141 BOARD (COMPONENT SIDE)

Step 2. BATT ALARM adjustment

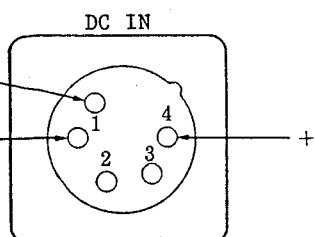
. Setting

Equipment: Regulated power supply	To be extended: PS-141 board
-----------------------------------	------------------------------

. Preparation

Connect the positive side of the regulated power supply to pin 4 of the DC IN connector and the negative side to pin 1.

The MICRO switch is turned ON by pressing this pin.



To supply power without using the KLR plug, set the MICRO switch on the DC IN connector to ON. If the switch is OFF, power is not supplied to the camera.

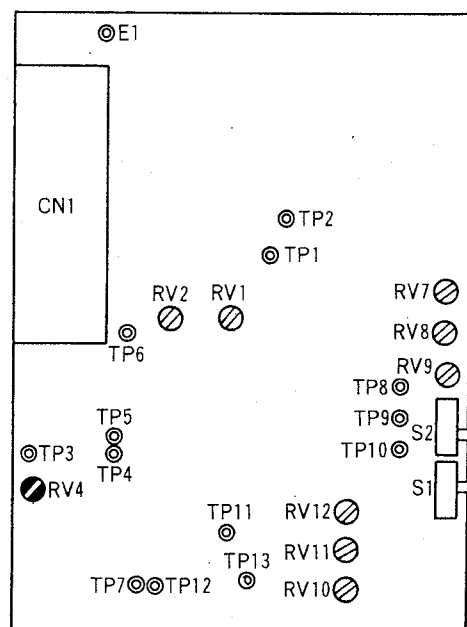
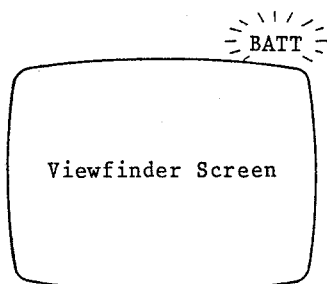
. Adjustment procedure

Test point: BATT indicator inside the viewfinder of the camera

Adjustment point:

RV4 (BAT ALARM)/PS-141 board

Adjustment: Reduce the voltage of the regulated power supply gradually from +12.0V, and adjust the RV4/PS-141 board so that the BATT indicator inside the viewfinder blinks when the voltage is $+10.8 \pm 0.05V$ or less.



PS-141 BOARD (COMPONENT SIDE)

Step 3. Sub carrier frequency adjustment

. Notes

- . Allow the unit to warm up for about 10 minutes before making this adjustment.
- . Make sure that the GENLOCK mode is not set.

. Setting

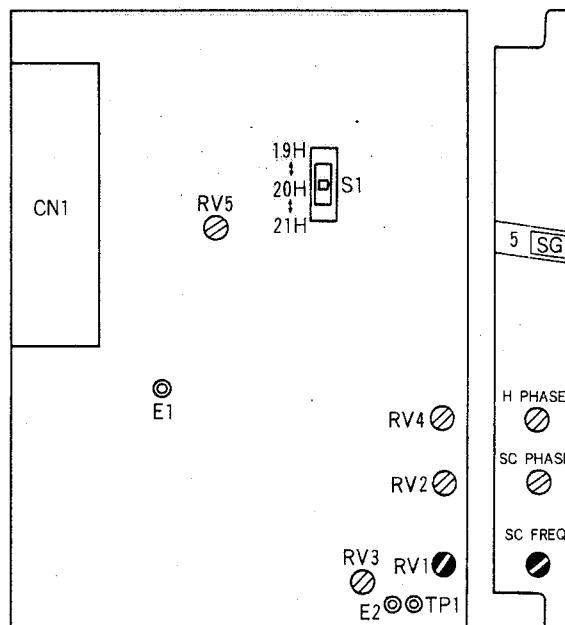
Equipment: Frequency counter	To be extended: SG-120 board
------------------------------	------------------------------

. Adjustment procedure

Test point : Pin A28 (GND: Pin A27)/extension board

Adjustment point: RV1/SG-120 board

Specification : 4,433,618Hz \pm 10Hz (PAL)
3,575,611Hz \pm 10Hz (PAL-M)



SG-120 BOARD (COMPONENT SIDE)

Step 4. SYNC width adjustment

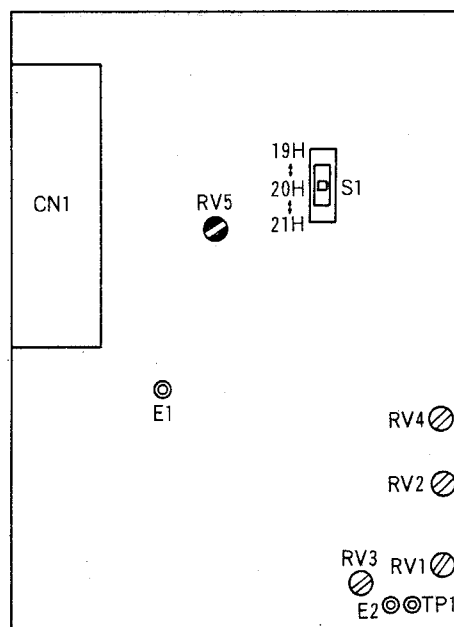
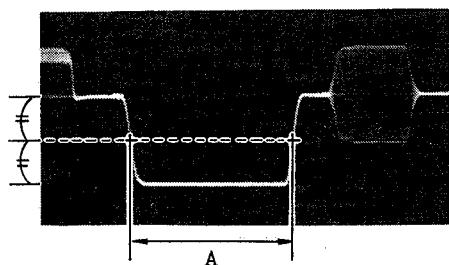
. Setting

Equipment: Waveform monitor (WFM)

To be extended: SG-120 board

. Adjustment procedure

1. Set the S1 **MODE** /EN-53 board to ENC.
2. Test point : VIDEO OUT terminal (external)
Adjustment point: RV5 (SYNC WIDTH)/SG-120 board
Specification : $A = 4.7 \pm 0.1 \mu s$



SG-120 BOARD (COMPONENT SIDE)

Step 5. SYNC phase adjustment

. Setting

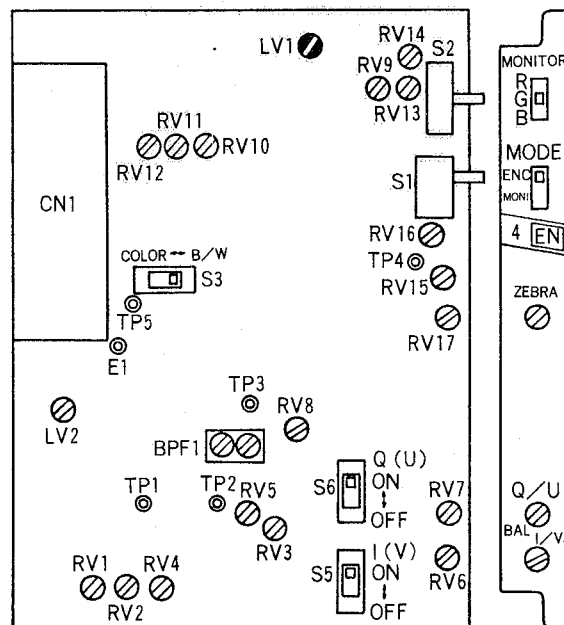
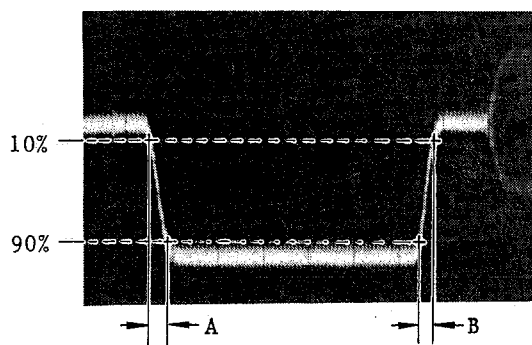
Equipment: Oscilloscope	To be extended: EN-53 board
-------------------------	-----------------------------

. Adjustment procedure

1. Set the S1 ☐ MODE /EN-53 board to ENC.
2. Test point : Pin A23 (GND: Pin A24)/extension board
Adjustment point: ☒ LV1 (SYNC PHASE)/EN-53 board

Specification : $A = B = 0.25 \pm 0.05 \mu s$

(No overshoot or under-
shoot shall appear
in the waveform.)



EN-53 BOARD (COMPONENT SIDE)

Step 6. Burst Flag adjustment (For PAL)

. Setting

Equipment: Waveform monitor (WFM)

To be extended: EN-53 board

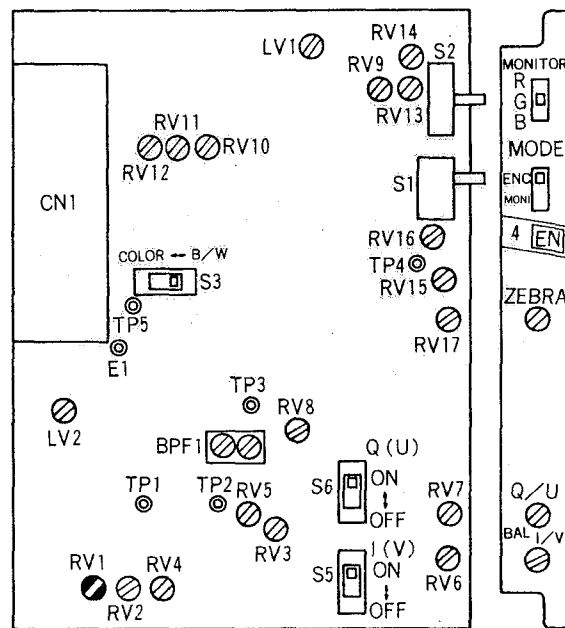
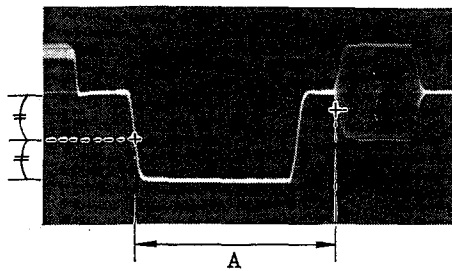
. Adjustment procedure

1. Set the S1 **MODE** /EN-53 board to ENC.

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV1/EN-53 board

Specification : $A = 5.6 \pm 0.1 \mu s$



EN-53 BOARD (COMPONENT SIDE)

Step 6. Burst Flag adjustment (For PAL-M)

. Setting

Equipment: Waveform monitor (WFM)

To be extended: EN-53 board

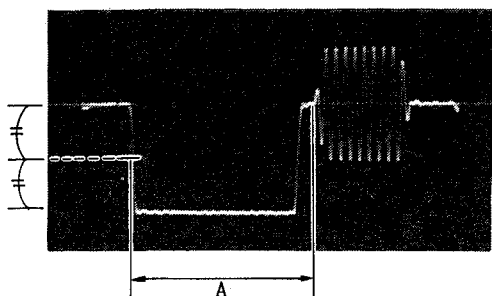
. Adjustment procedure

1. Set the S1 **MODE** /EN-53 board to ENC.

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV1/EN-53 board

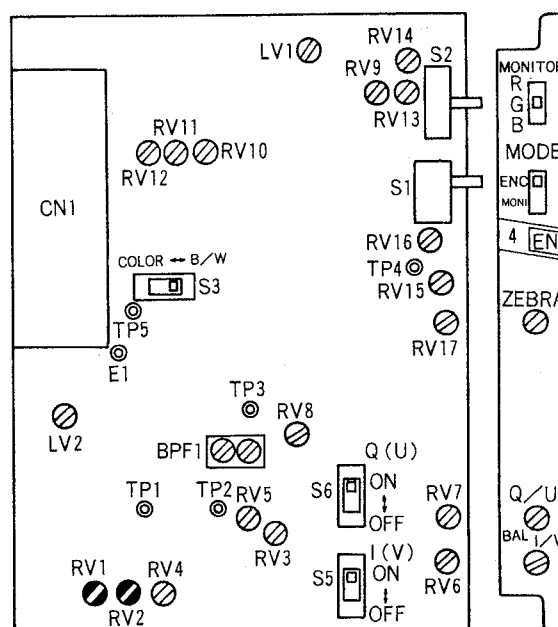
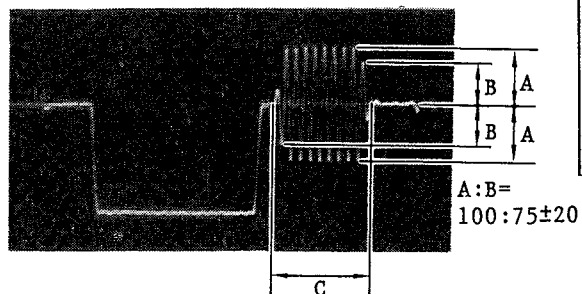
Specification : $A = 5.3 \pm 0.1 \mu s$



3. Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV2/EN-53 board

Specification : $C = 9$ cycles



EN-53 BOARD (COMPONENT SIDE)

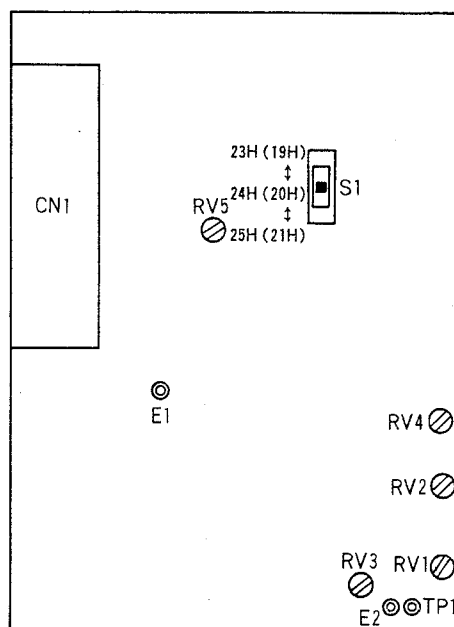
Step 7. V BLKG width adjustment

. Adjustment procedure

To be extended : SG-120 board

Adjustment point: S1 (V BLKG SELECT)/SG-120 board

Adjustment : The V BLKG width can be set to 23H(19H), 24H(20H), 25H(21H) with S1. Generally, set it to 24H(20H).



SG-120 BOARD (COMPONENT SIDE)

Step 8. INT SC phase adjustment

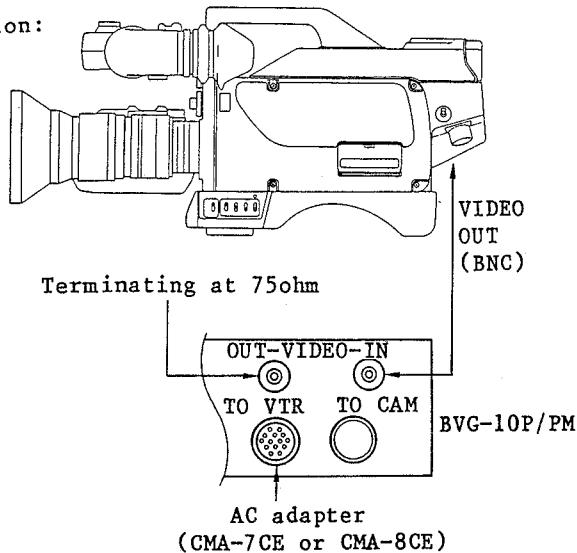
. Setting

Equipment: CF pulse generator	To be extended: SG-120 board
-------------------------------	------------------------------

. Adjustment procedure

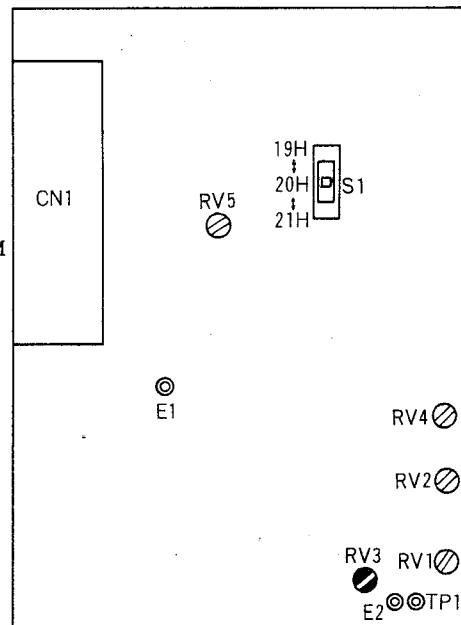
(This adjustment procedure must be followed when the CF pulse generator (Sony BVG-10P/PM) is used as a measuring instrument.)

Connection:

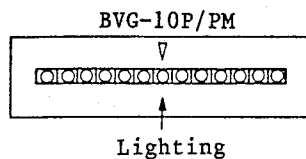


Preparation: Set the selector knob of the BVG-10P/PM to the SOURCE CHECK position.

Adjustment : Adjust RV3/SG-120 board so that the LED of the BVG-10P/PM goes on at the central position.



SG-120 BOARD (COMPONENT SIDE)



Step 9. BARS level adjustment

. Setting

Equipment : Oscilloscope	Trigger : Pin B8/extension board
To be extended: EN-53 board	GND point: Pin A2/extension board

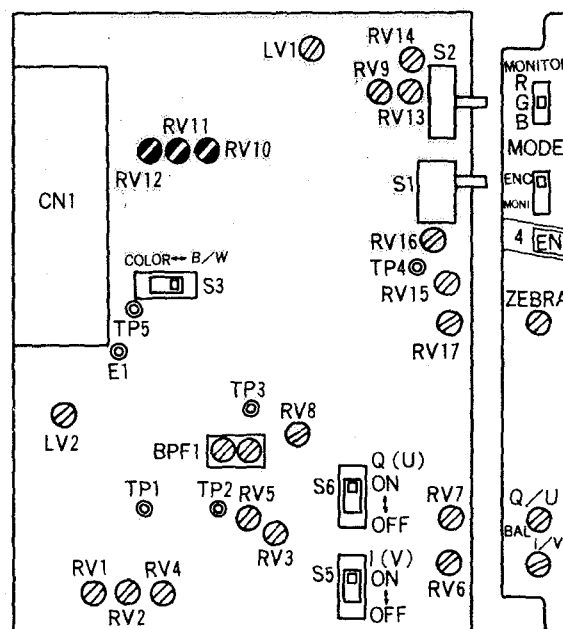
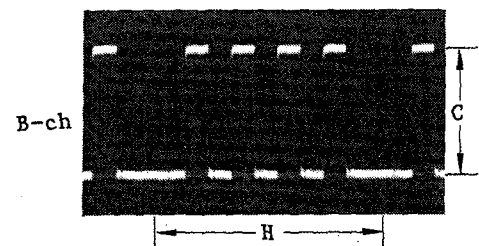
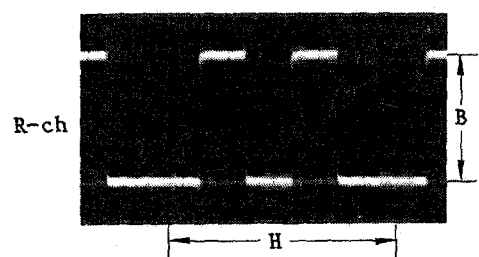
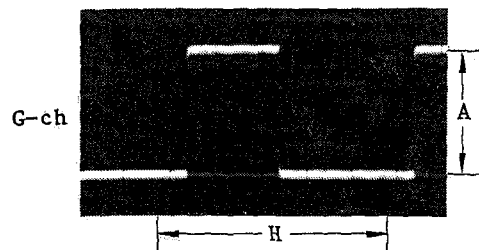
. Preparation

Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
--

. Adjustment procedure

Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/EN-53 extension board	Adjustment point/EN-53 extension board	Specification
G-ch	Pin A7	RV11	$A = 1.05 \pm 0.05V$
R-ch	Pin A5	RV10	$B = 1.05 \pm 0.05V$
B-ch	Pin A9	RV12	$C = 1.05 \pm 0.05V$



EN-53 BOARD (COMPONENT SIDE)

Step 10. EN Y level adjustment

. Setting

Equipment: Waveform monitor (WFM)

To be extended: EN-53 board

. Preparation

Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.

Set the S1 **MODE** /EN-53 board to ENC.

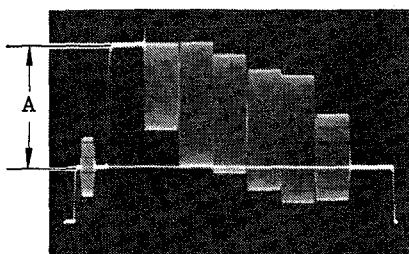
. Adjustment procedure

[For PAL]

Test point : VBS OUT terminal
(external)

Adjustment point: \odot RV16/EN-53 board

Specification : $A = 700 \pm 10 \text{ mV}$



[For PAL-M]

1. Test point : VIDEO OUT terminal
(external)

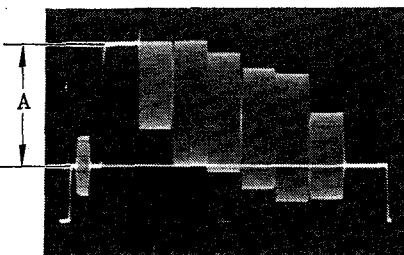
Adjustment point: \odot RV13/EN-53 board

Specification : Set up level = $50 \pm 10 \text{ mV}$

2. Test point : VBS OUT terminal
(external)

Adjustment point: \odot RV16/EN-53 board

Specification : $A = 700 \pm 10 \text{ mV}$

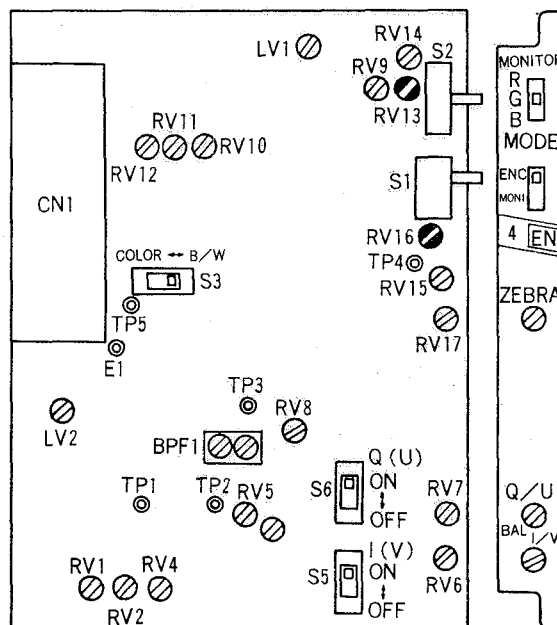


3. Repeat steps 1 and 2 several times.

. Notes

After this adjustment, set the switch as follows:

. Set the OUTPUT switch on the side of the camera to CAM/DCC OFF.



EN-53 BOARD (COMPONENT SIDE)

Step 11. MONITOR OUT level adjustment

. Notes

Before this adjustment, step 10, EN Y level adjustment, must be completed.

. Setting

Equipment: Waveform monitor

To be extended: EN-53 board

. Preparation

Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.

Set the S1 **MODE**/EN-53 board to ENC.

. Adjustment procedure

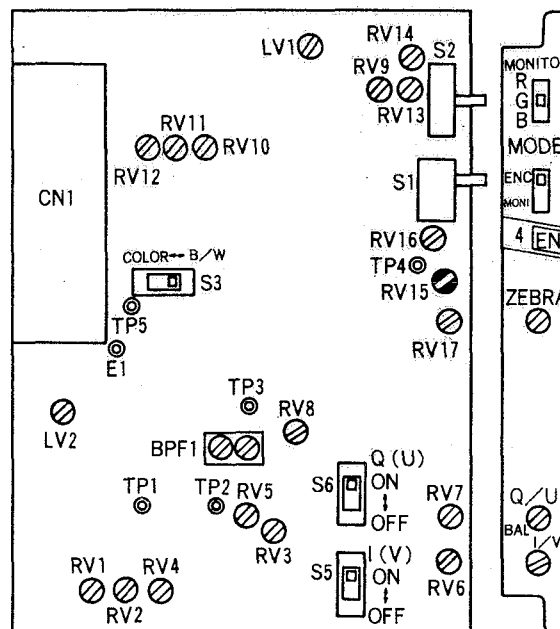
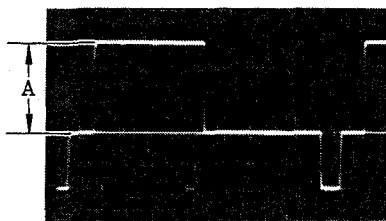
1. Set the S1 **MODE**/EN-53 board to MONI.

Set the S2 **MONITOR**/EN-53 board to G.

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV15/EN-53 board

Specification : $A = 540 \pm 10\text{mV}$



EN-53 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, set the OUTPUT switch on the side of the camera to the CAM/DCC OFF position, and S1 **MODE**/EN-53 board to ENC.

Step 12. Carrier balance adjustment

. Setting

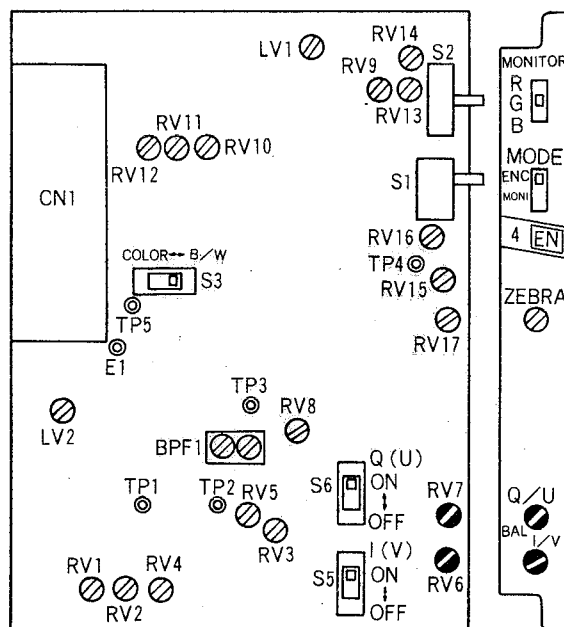
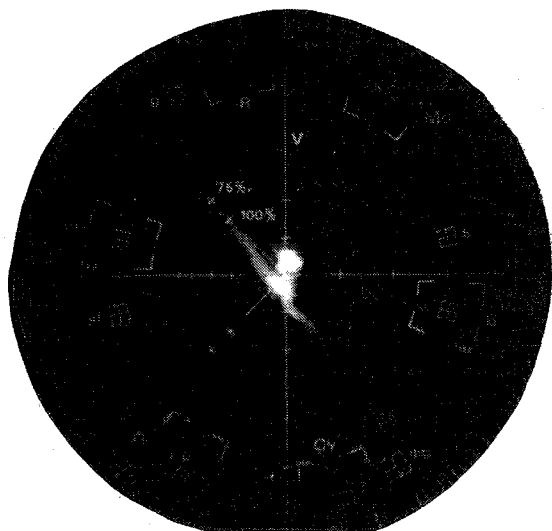
Equipment: Vectorscope (MAX GAIN)

. Adjustment procedure

1. Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.

Set S1 **MODE** /EN-53 board to ENC.

2. Adjust RV6 (V BAL) and RV7 (U BAL)/EN-53 board so that the beam spot of the black level is in the center of the vectorscope screen.



EN-53 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, set the OUTPUT switch on the side of the camera to the CAM/DCC OFF position.

Step 13. Color bar adjustment

. Notes

Step 10, EN Y level adjustment must be completed before this adjustment.

. Setting

Equipment: Waveform monitor (WFM)

To be extended: EN-53 board

. Preparation

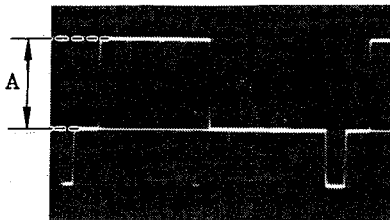
- . Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
- . Set the S2 **MONITOR** /EN-53 board to G.
- . Set the S1 **MODE** /EN-53 board to MONI.

. Adjustment procedure

1. Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV11/EN-53 board

Specification : $A = 540 \pm 10 \text{ mV}$



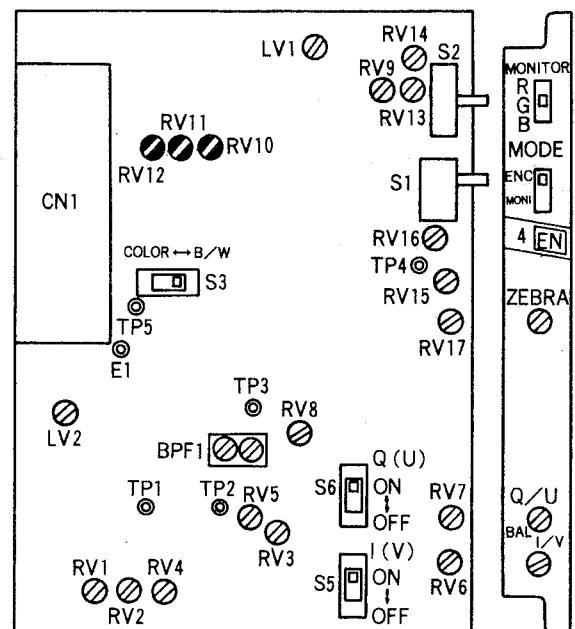
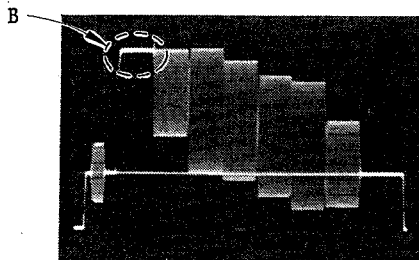
2. Set the S1 **MODE** /EN-53 board to ENC.

3. Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV10/EN-53 board

\odot RV12/EN-53 board

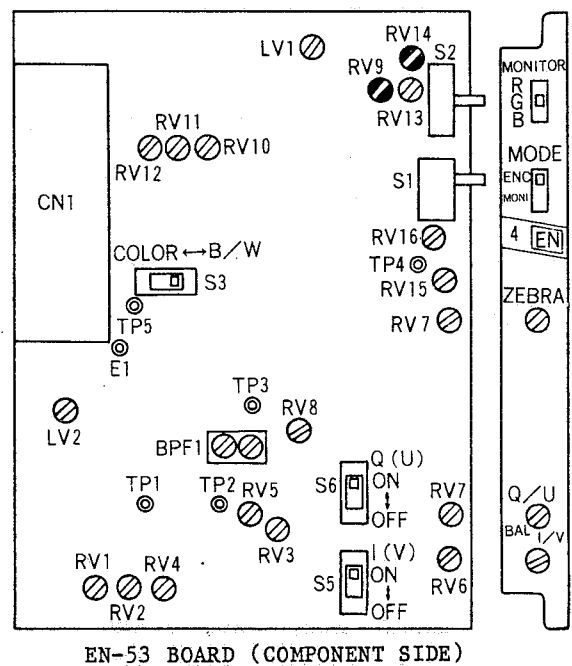
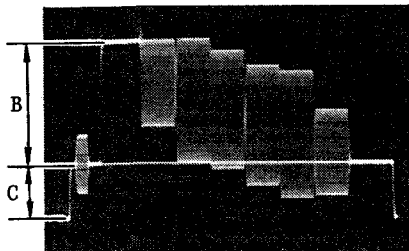
Specification : The carrier leakage of portion B must be minimized.



EN-53 BOARD (COMPONENT SIDE)

↓ (Turn over the page.)

4. Test point: VIDEO OUT terminal (external)
 Adjustment: B = $700 \pm 10 \text{mV}$; RV9/EN-53 board
 C = $300 \pm 10 \text{mV}$; RV14/EN-53 board



. Notes

After this adjustment, set the OUTPUT switch on the side of the camera to the CAM/DCC OFF position.

Step 14. Color vector adjustment

. Setting

Equipment: Vectorscope

To be extended: EN-53 board

. Preparation

. Vectorscope setting

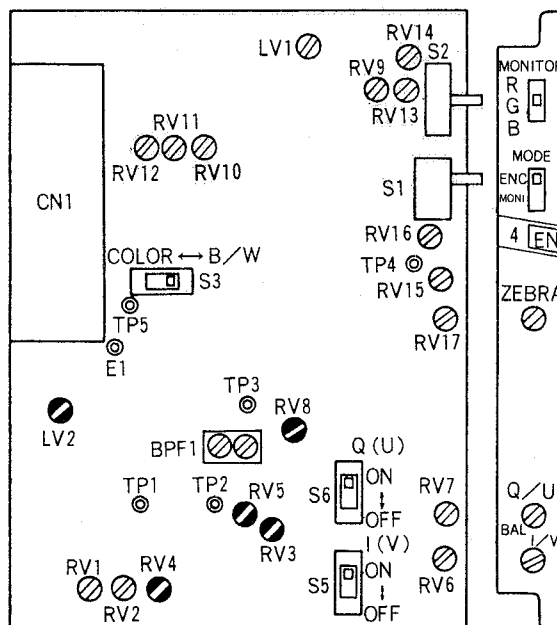
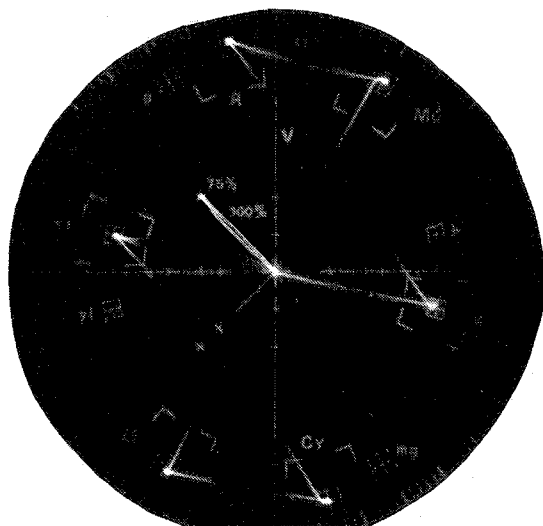
Set the GAIN switch to 75%CAL position.

Adjust the PHASE control so that the beam spot of the burst is set to the 75% axis.

. Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.

. Adjustment procedure

1. Adjust the \odot RV4 on the EN-53 board so that the burst spot is located at 75% scale mark on the vectorscope.
2. Adjust the \odot RV3 on the EN-53 board and the PHASE control on the vectorscope so that the burst spot is located on the burst graticule line.
3. Adjust the \odot RV5, \odot RV8 and \odot LV2 on the EN-53 board alternately and repeatedly two or three times so that all the chroma spots are located on the specified scale point on the vectorscope screen.
4. Alternately repeat item 1 to 3 two or three times.



EN-53 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, set the OUTPUT switch on the side of the camera to the CAM/DCC OFF position.

Step 15. PA carrier balance adjustment

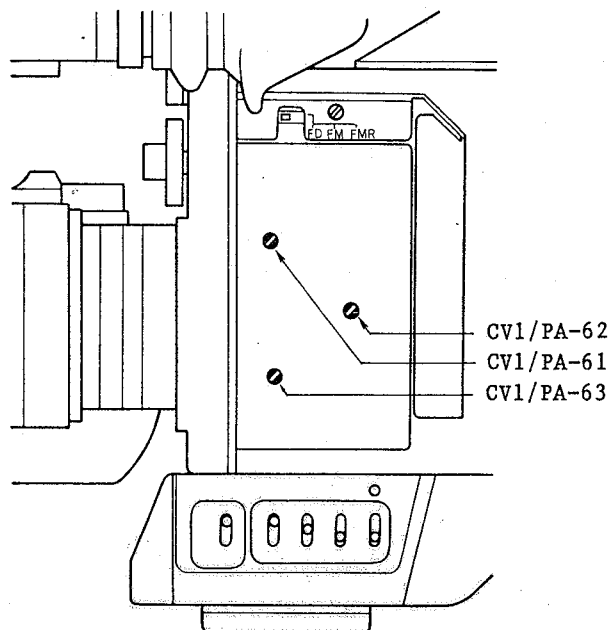
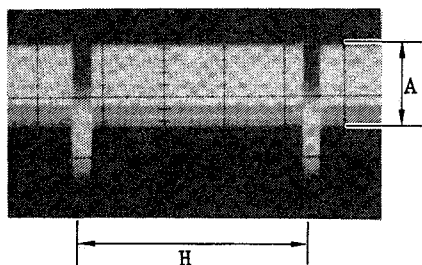
. Setting

Equipment: Oscilloscope	To be extended: VA-46 board
Lens iris: Close "C"	Trigger : Pin B22/extension board

. Adjustment procedure

Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ VA-46 board	Adjustment point	Specification
G-ch	TP5 (GND: E1)	⊙CV1/PA-62	Level "A" of the waveform shown in the picture below must be mimimized.
B-ch	TP9 (GND: E1)	⊙CV1/PA-61	
R-ch	TP1 (GND: E1)	⊙CV1/PA-63	



Step 16. VA video level adjustment 1

. Notes

When the TP5 (GND: E1)/VA-46 board is used as the test point, connect a 10-kohm resistor in series to the oscilloscope probe. After this adjustment, proceed to step 17, VA video level adjustment.

. Setting

Object : Grayscale chart	To be extended: VA-46 board
Equipment: Oscilloscope	Trigger : Pin B22/extension board

. Adjustment procedure

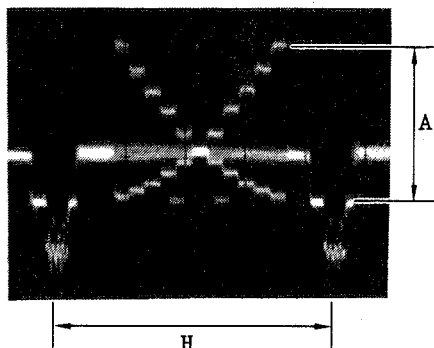
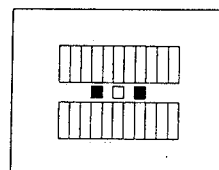
1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.

2. Test point : TP5 (GND: E1)/VA-46 board

Adjustment point: Lens iris

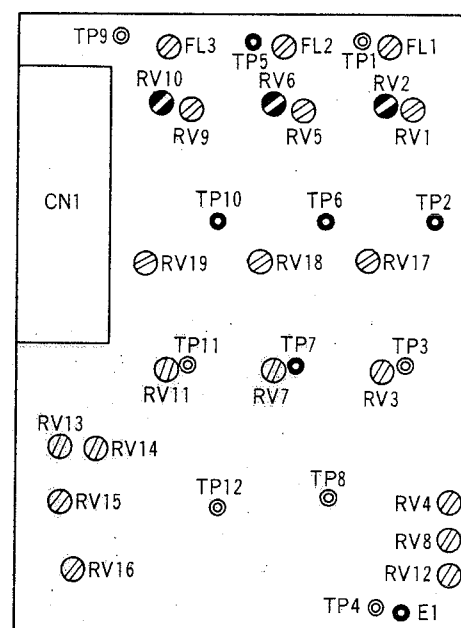
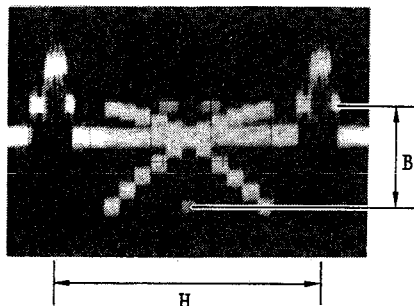
Specification : A = $130 \pm 5\text{mV}$

Monitor Screen



3. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ VA-46 board	Adjustment point/ VA-46 board	Specification
G-ch	TP6 (GND: E1)	RV6	B = $250 \pm 5\text{mV}$
B-ch	TP10 (GND: E1)	RV10	B = $250 \pm 5\text{mV}$
R-ch	TP2 (GND: E1)	RV2	B = $250 \pm 5\text{mV}$



VA-46 BOARD (COMPONENT SIDE)

Step 17. VA video level adjustment 2

. Notes

- . Step 16, VA video level adjustment must be completed before this adjustment.
- . When the TP5 (GND: E1)/VA-46 board is used as the test point, connect a 10-kohm resistor in series to the oscilloscope probe.

. Setting

Test point: Oscilloscope
Object : Grayscale chart

To be extended: VA-46 board
Trigger : Pin B22/extension board

. Adjustment procedure

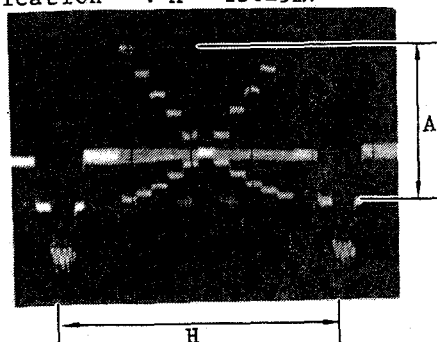
1. Shoot the grayscale chart as shown in the figure at right.

Set the GAIN switch on the side of the camera to 0dB.

2. Test point : TP5 (GND)/VA-46 board

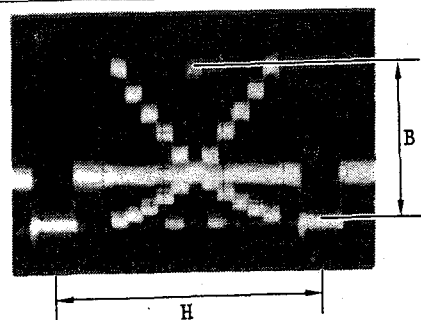
Adjustment point: Lens iris

Specification : $A = 130 \pm 5\text{mV}$

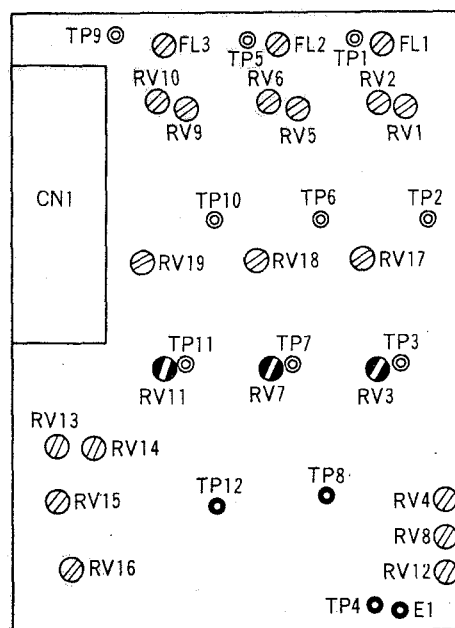
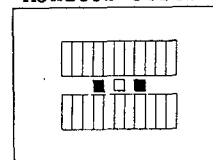


3. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ VA-46 board	Adjustment point/ VA-46 board	Specification
G-ch	TP8 (GND: E1)	RV7	$B = 600 \pm 10\text{mV}$
B-ch	TP12 (GND: E1)	RV11	
R-ch	TP4 (GND: E1)	RV3	



Monitor Screen



VA-46 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 18, test waveform level adjustment.

Step 18. Test waveform level adjustment

. Notes

Step 17, VA video level adjustment 2 must be completed before this adjustment.

. Setting

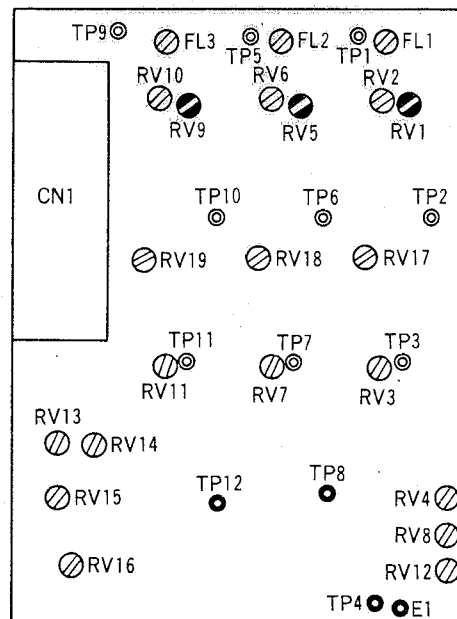
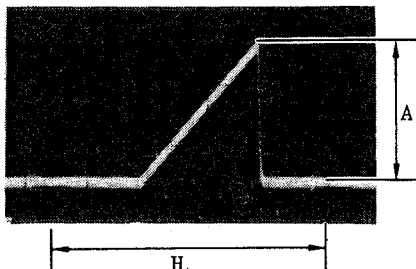
Equipment : Oscilloscope
To be extended: VA-46 board

Trigger: Pin B22/extension board

. Adjustment procedure

1. Set the S2 **TEST** /AT-46 board to ON.
2. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ extension board	Adjustment point/ VA-46 board	Specification
G-ch	TP8 (GND: E1)	RV5	A = 600±10mV
B-ch	TP12 (GND: E1)	RV9	
R-ch	TP4 (GND: E1)	RV1	



VA-46 BOARD (COMPONENT SIDE)

Step 19. G (1H) OUT level adjustment

. Setting

Object : Grayscale chart	To be extended: EI-16 board
Equipment: Oscilloscope, waveform monitor	Trigger : Pin A21/extension board

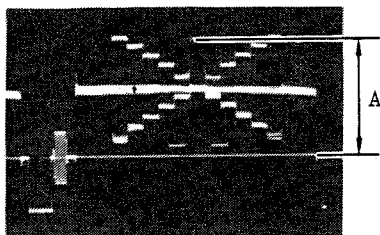
. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: Lens iris

Specification : $A = 700 \pm 10 \text{mV}$



3. Adjust CH1 and CH2 of the oscilloscope to the GND range so that their GND lines match. Then, make the VOLTS/DIV of CH1 and CH2 the same, and set the DC range.

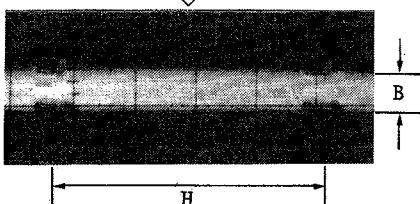
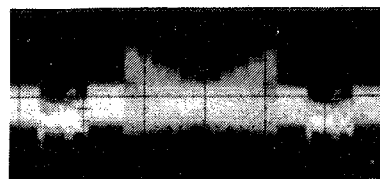
4. Oscilloscope mode: ADD

CH2 mode : INVERT

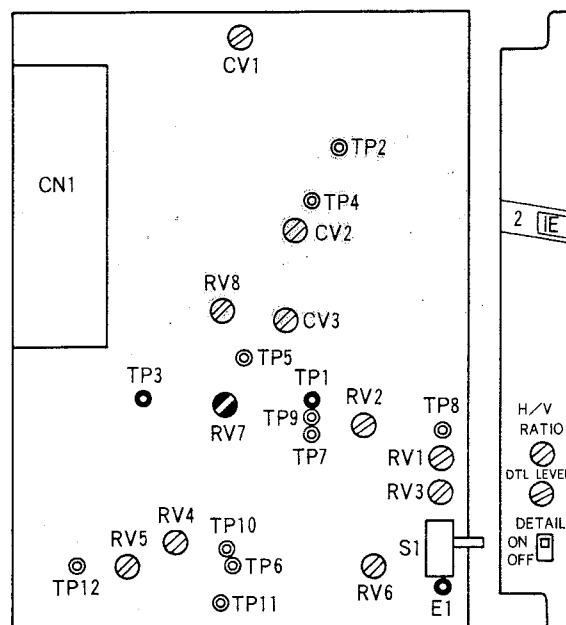
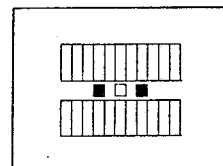
5. Test point : CH1 TP1 (GND: E1)/IE-16 board
CH2 TP3 (GND: E1)/IE-16 board

Adjustment point: RV7/IE-16 board

Specification : $B = 10 \text{mV}$ or less



Monitor Screen



IE-16 BOARD (COMPONENT SIDE)

Step 20. G (2H) OUT level adjustment

. Setting

Object : Grayscale chart	To be extended: IE-16 board
Equipment: Oscilloscope, waveform monitor	Trigger : Pin A21/extension board

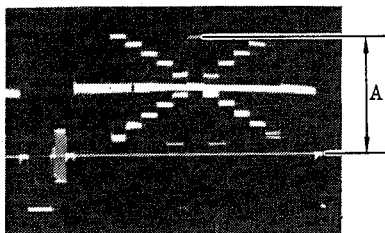
. Adjustment procedure

1. Shoot the grayscale chart and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: Lens iris

Specification : $A = 700 \pm 10 \text{mV}$



3. Set CH1 and CH2 of the oscilloscope to the GND range so that their GND lines match. Then, make VOLTS/DIV of CH1 and CH2 the same and set the DC range.

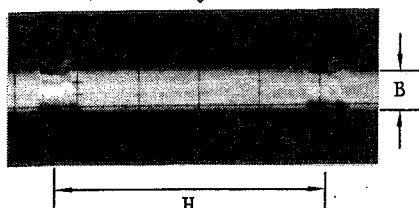
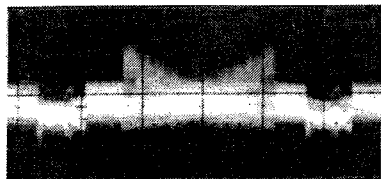
4. Oscilloscope mode: ADD

CH2 mode : INVERT

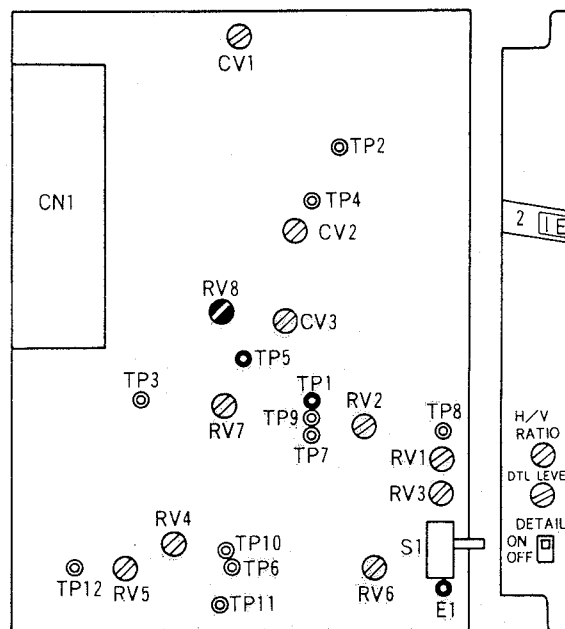
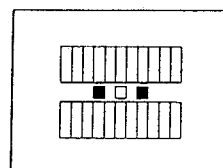
5. Test point : CH1 TP1 (GND: E1)/
IE-16 board
CH2 TP5 (GND: E1)/
IE-16 board

Adjustment point : RV8/IE-16 board

Specification : $B = 10 \text{mV}$ or less



Monitor Screen



IE-16 BOARD (COMPONENT SIDE)

Step 21. 1H, 2H DELAY signal phase adjustment

. Setting

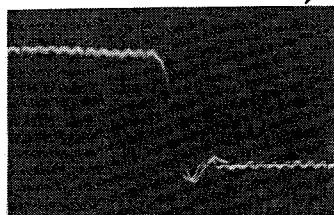
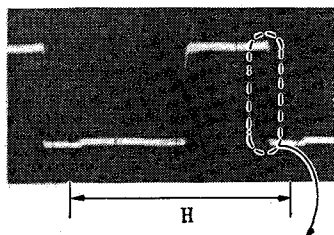
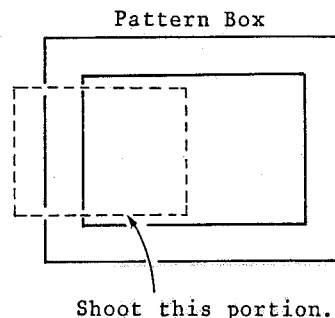
Object : White portion of pattern box	To be extended: IE-16 board
Equipment: Oscilloscope, waveform monitor	Trigger : Pin A21/extension board

. Adjustment procedure

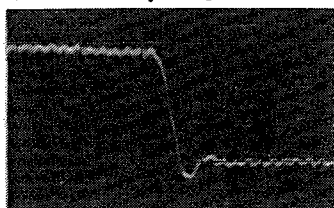
1. Shoot the white portion of the pattern box as shown in the figure at the right.
2. Adjust the lens iris so that the white level of the VIDEO OUT waveform is $700 \pm 10\text{mV}$.
3. Set CH1 and CH2 of the oscilloscope to "GND Range" and match their GND levels. Then set the VOLTS/DIV of CH1 and CH2 to the same level, and then switch them to "AC Range".
4. Test point : CH1 TP1 (GND: E1)/
IE-16 board
CH2 TP3 (GND: E1)/
IE-16 board

Adjustment point: CV2/IE-16 board

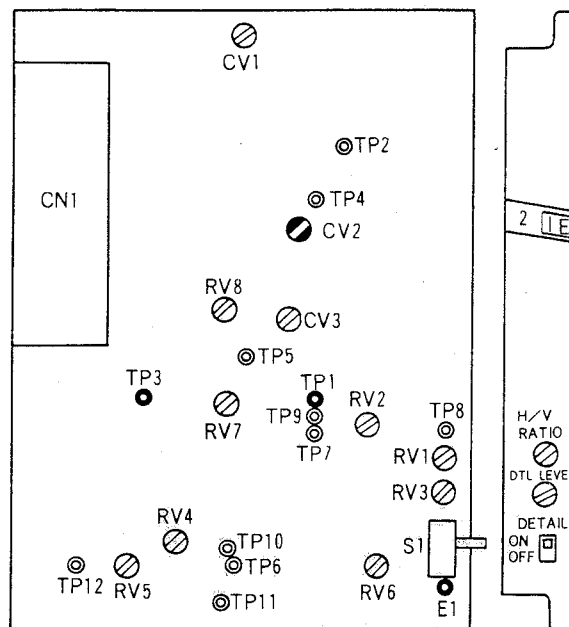
Specification : There shall be no phase shift between the CH1 and CH2 waveforms at the leading edge.



Eliminate the phase shift.



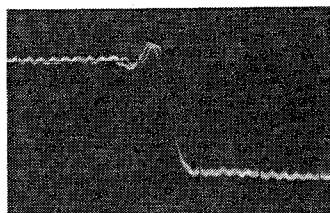
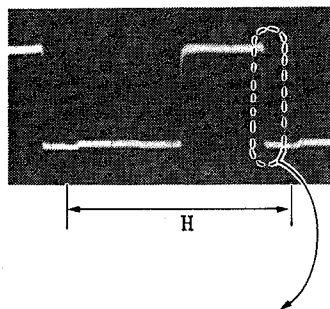
(Turn over the page.)



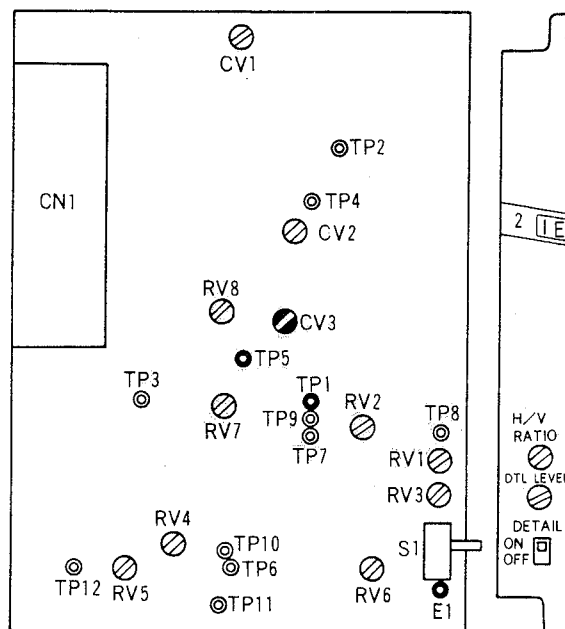
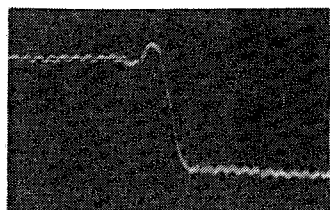
4. Test point : CH1 TP1 (GND: E1)/IE-16 board
 CH2 TP5 (GND: E1)/IE-16 board

Adjustment point: CV3/IE-16 board

Specification : There shall be no phase shift between the CH1 and CH2 waveforms at the leading edge.



Eliminate the phase shift.



IE-16 BOARD (COMPONENT SIDE)

Step 22. Gamma set adjustment

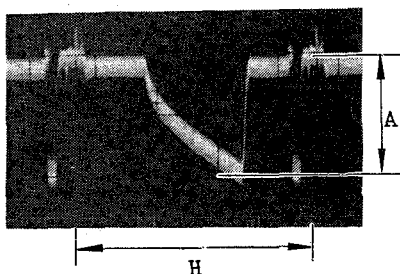
. Setting

Equipment : Oscilloscope	Trigger: Pin B24/extension board
To be extended: PR-90 board	

. Adjustment procedure

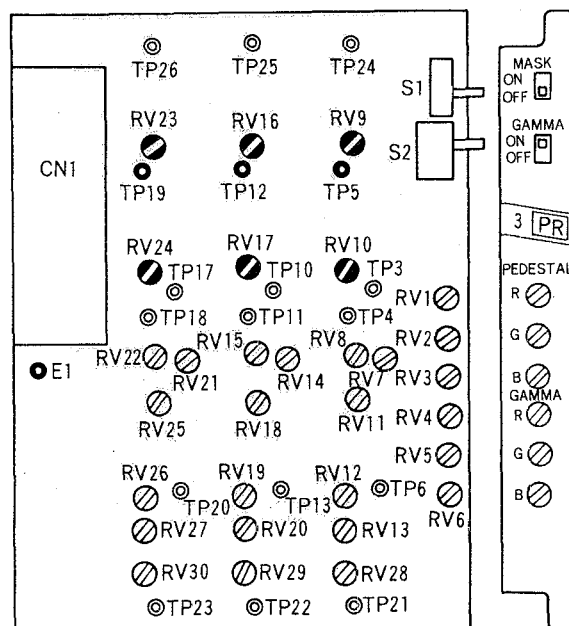
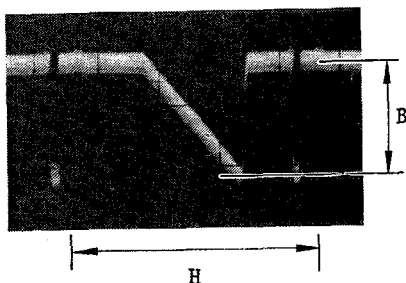
- Set the S2 **TEST** /AT-46 board to ON.
Set the S2 **GAMMA** /PR-90 board to ON.
- Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board	Specification
G-ch	TP12 (GND: E1)	RV17	A = $200 \pm 5\text{mV}$
B-ch	TP19 (GND: E1)	RV24	A = $200 \pm 5\text{mV}$
R-ch	TP5 (GND: E1)	RV10	A = $200 \pm 5\text{mV}$




- Set the S2 **GAMMA** /PR-90 board to OFF.
- Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board	Specification
G-ch	TP12 (GND: E1)	RV16	B = $200 \pm 5\text{mV}$
B-ch	TP19 (GND: E1)	RV23	B = $200 \pm 5\text{mV}$
R-ch	TP5 (GND: E1)	RV9	B = $200 \pm 5\text{mV}$




PR-90 BOARD (COMPONENT SIDE)

↓ (Turn over the page.)

5. Turn the \odot RV4 **R GAMMA** /PR-90 board fully counterclockwise. 

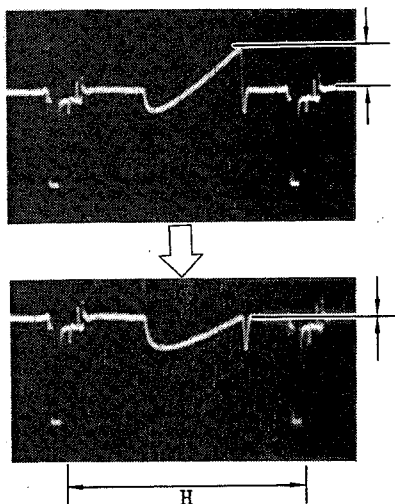
Turn the \odot RV5 **G GAMMA** /PR-90 board fully counterclockwise. 

Turn the \odot RV6 **B GAMMA** /PR-90 board fully counterclockwise. 

Set the S2 **GAMMA** /PR-90 board to ON.

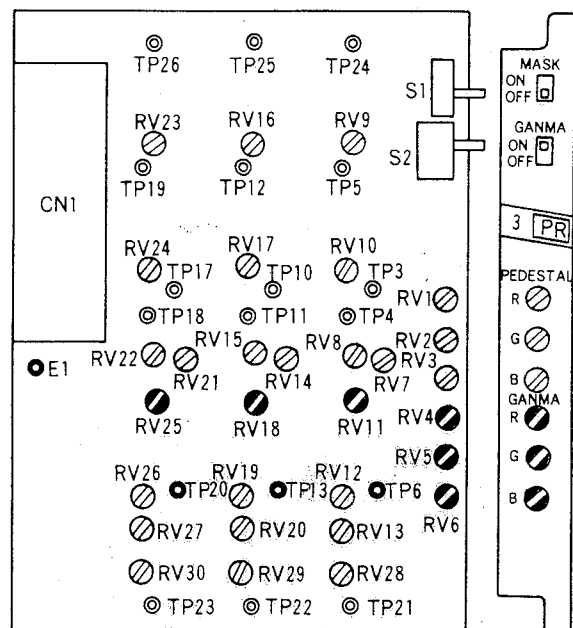
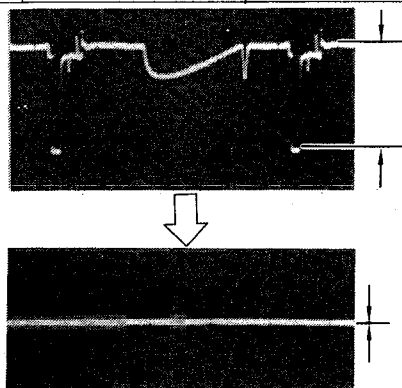
6. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board
G-ch	TP13 (GND: E1)	\odot RV18
B-ch	TP20 (GND: E1)	\odot RV25
R-ch	TP6 (GND: E1)	\odot RV11



7. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board
G-ch	TP13 (GND: E1)	\odot RV5 G GAMMA
B-ch	TP20 (GND: E1)	\odot RV6 B GAMMA
R-ch	TP6 (GND: E1)	\odot RV4 R GAMMA



PR-90 BOARD (COMPONENT SIDE)

Step 23. G/B/R offset adjustment


. Setting


Equipment: Waveform monitor (WFM)	To be extended: VA-46 board
-----------------------------------	-----------------------------

. Preparation

Set the OUTPUT switch on the side of the camera to CAM/DCC OFF.

Set the lens iris to close, "C".

Turn the RV8 **G V MOD** /PS-141 board fully clockwise. 

Turn the RV9 **B V MOD** /PS-141 board fully clockwise. 

Turn the RV7 **R V MOD** /PS-141 board fully clockwise. 

Set the S1 **MODE** /EN-53 board to MONI.

Adjust the RV1 **R PED** /PR-90 board to the mechanical center.

Adjust the RV2 **G PED** /PR-90 board to the mechanical center.

Adjust the RV3 **B PED** /PR-90 board to the mechanical center.

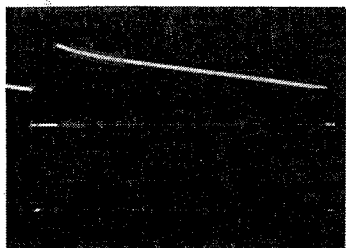
Set the S2 **TEST** /AT-46 board to OFF.

. Adjustment procedure

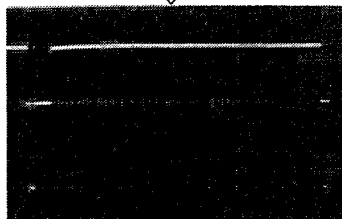
Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	S2 MONITOR / EN-53 board	Adjustment point/ VA-46 board
G-ch	"G" position	RV18
B-ch	"B" position	RV19
R-ch	"R" position	RV17

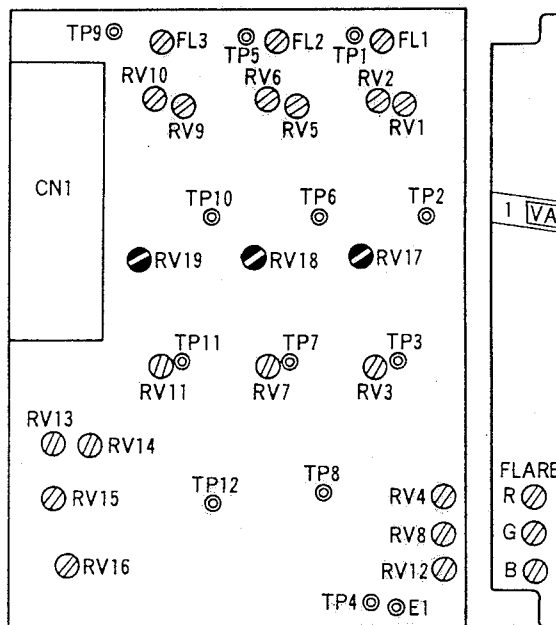
VIDEO OUT terminal (external)



Adjust so that the waveform is flat.



V



VA-46 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 24, G/B/R V MOD adjustment and step 26, pedestal adjustment.

Step 24. G/B/R V MOD adjustment

. Setting

Equipment: Waveform monitor (WFM)	To be extended: PS-141 board
Object : White window chart	

. Preparation

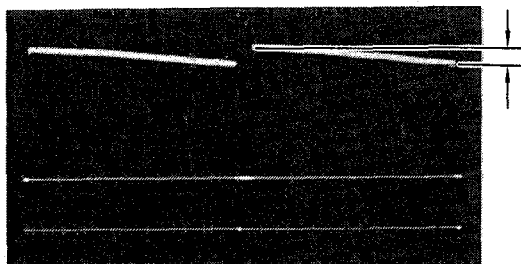
1. Set the S1 MODE /EN-53 board to MONI.	3. Adjust the lens iris so that the white level of the VIDEO OUT terminal (external) is $700 \pm 10 \text{ mV}$.
2. Shoot the white portion of the white window chart, and adjust the zoom control so that it touches the under scanned picture frame on the monitor screen.	4. Set the DISPLAY switch/waveform monitor to 2 FIELD.

. Adjustment procedure

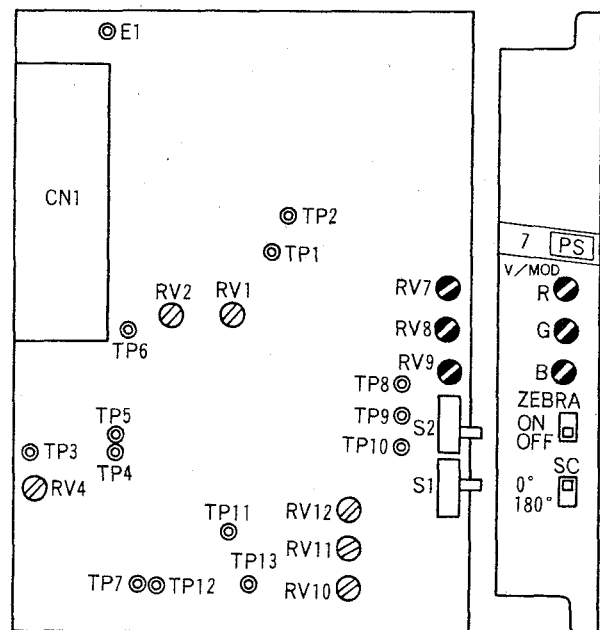
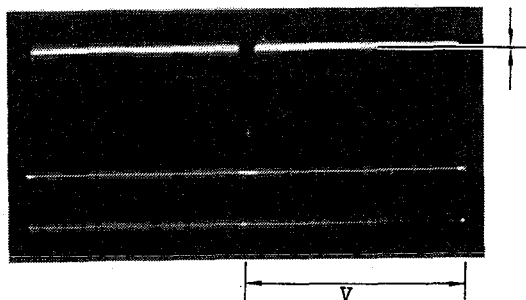
Adjust the G-ch, R-ch, and B-ch systems separately as follows:

	S2 MONITOR / EN-53 board	Adjustment point / PS-141 board
G-ch	"G" position	RV8
R-ch	"R" position	RV7
B-ch	"B" position	RV9

VIDEO OUT terminal (external)



Adjust so that the waveform is flat.



PS-141 BOARD (COMPONENT SIDE)

Step 25. Black set adjustment

. Setting

Equipment: Waveform monitor	To be extended: PS-141 board
-----------------------------	------------------------------

. Preparation

Set the Lens iris to close "C".

Set the S1 **MODE** /EN-53 board to "MONI" board.

Adjust the **RV1** **R PED** /PR-90 board to the mechanical center.

Adjust the **RV2** **G PED** /PR-90 board to the mechanical center.

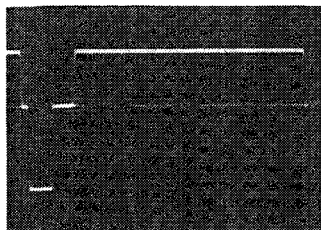
Adjust the **RV3** **B PED** /PR-90 board to the mechanical center.

. Adjustment procedure

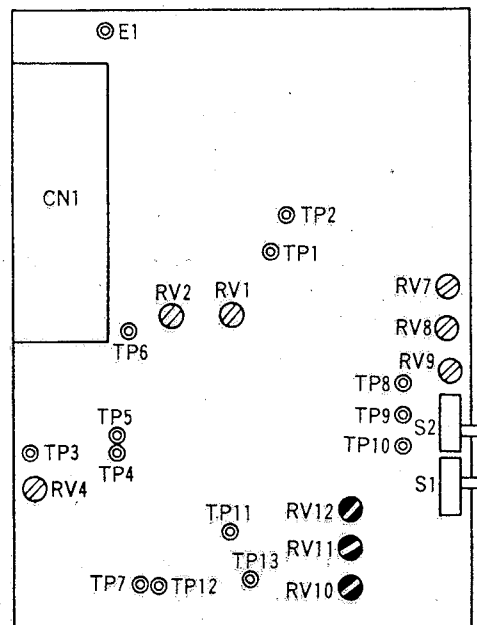
Adjust the G-ch, R-ch, and B-ch systems separately as follows:

	S2 MONITOR / EN-53 board	Adjustment point/ PS-141 board	Specification
G-ch	"G" position	RV11	When the GAIN switch on the side of the camera is switched from 0 to 9, then to 18, the black level shall not fluctuate.
R-ch	"R" position	RV10	
B-ch	"B" position	RV12	

VIDEO OUT terminal (external)



Shall not fluctuate.



PS-141 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 26, pedestal adjustment.

Step 26. Pedestal adjustment

. Notes

Step 25, black set adjustment must be completed before this adjustment.

. Setting

Equipment: Waveform monitor, vectorscope (MAX GAIN)

. Preparation

Set the lens iris to close "C".

Set the S2 **MONITOR** /EN-53 board to G.

Set the S1 **MODE** /EN-53 board to MONI.

Set the GAIN switch on the side of the camera to 0 dB.

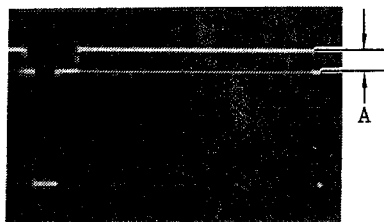
. Adjustment procedure

1. Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV2/PR-90 board

Specification : A = 18 ± 10 mV (PAL)

A = 70 ± 10 mV (PAL-M)

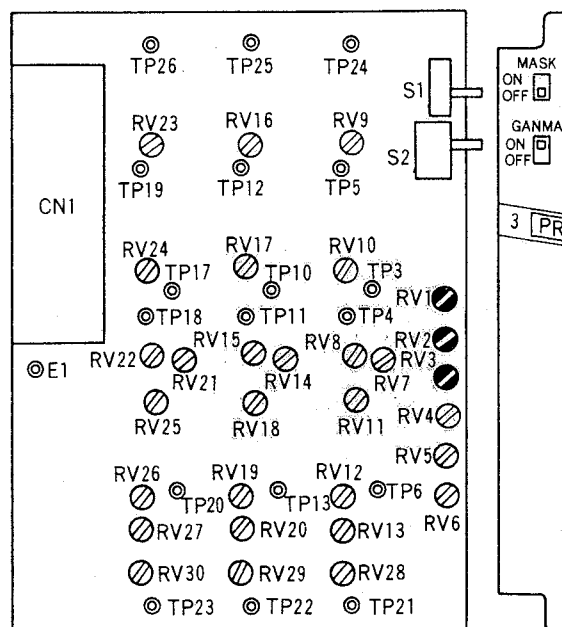
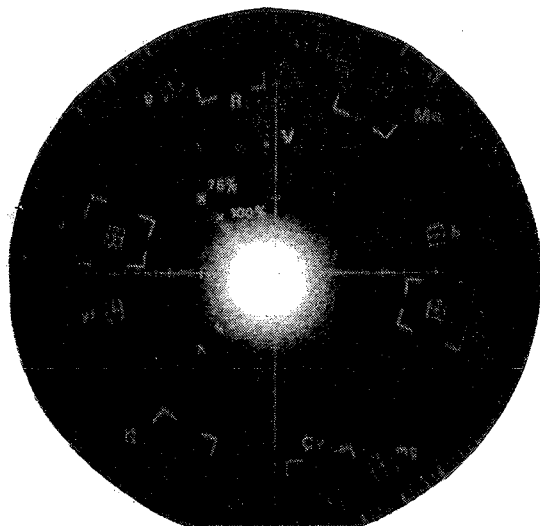


2. Set the S1 **MODE** /EN-53 board to ENC.

3. Test point : VIDEO OUT terminal (external)

Adjustment point: \odot RV1 and \odot RV3/PR-90 board

Specification : The beam spot of the black level must be in the center of the vectorscope screen.



PR-90 BOARD (COMPONENT SIDE)


Step 27. Flare adjustment

. Setting

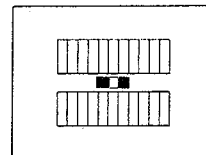
Object : Grayscale chart

Equipment: Waveform monitor

. Preparation

- . Set S1 **MODE**/EN-53 board to ENC.
- . Turn the **RV8** (G FLARE)/VA-46 board fully counterclockwise. 
- . Paste opaque nonreflective cloth (velvet, for example) on the grayscale chart as shown in the figure at the right so that the standard of the black level can be set.

Monitor Screen



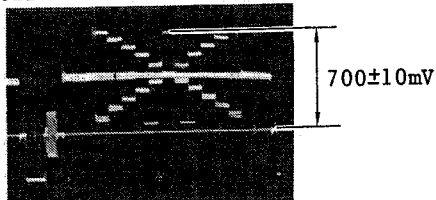
.. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the undersanned picture frame on the monitor.

2. Test point : VIDEO OUT terminal (external)

Adjustment point: Lens iris

Specification : $700 \pm 10 \text{ mV}$

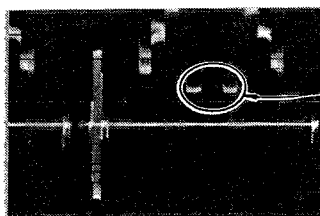


3. Open the lens iris so that the iris value is 1 greater than that in step 2.

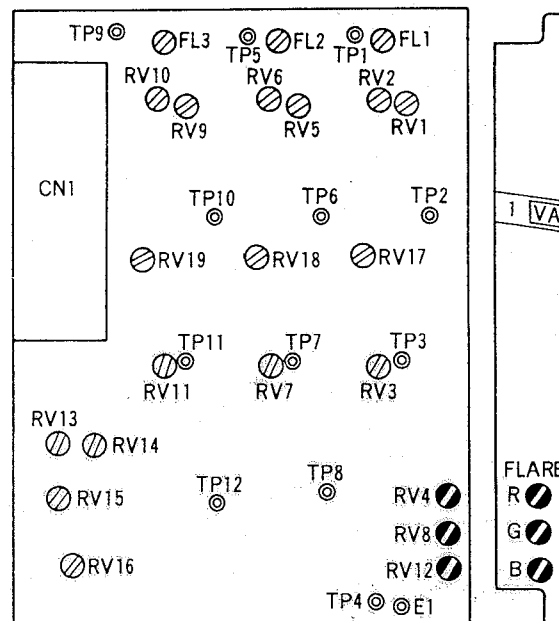
4. Test point : VIDEO OUT terminal (external)

Adjustment point: **RV4**, **RV12**/VA-46 board

Specification : The carrier leakage of the black level must be minimized.



The carrier leakage must be minimized.



. Notes

Repeat the following adjustments three to four times: Black set adjustment in step 25, pedestal adjustment in step 26, and flare adjustment in step 27 in that order.

Step 28. PR output level adjustment

. Notes

Step 22, gamma set adjustment must be completed before this adjustment.

. Setting

Equipment : Oscilloscope
To be extended: PR-90 board

Trigger: Pin B24/extension board

. Preparation

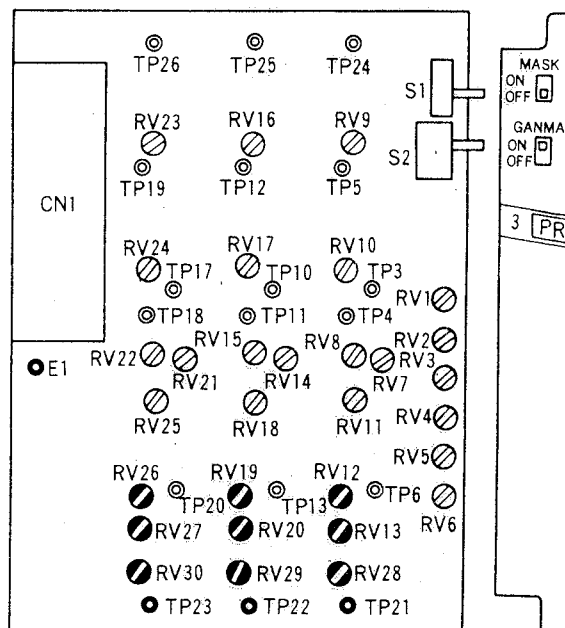
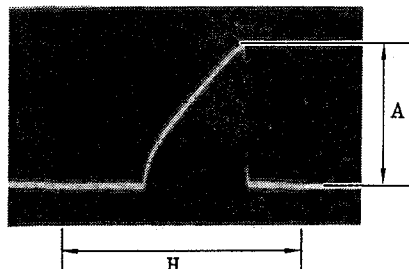
Set S2 **TEST** /AT-46 board to ON.
Set S2 **GAMMA** /PR-90 board to ON.
Turn the \odot RV13/PR-90 board fully counterclockwise.
Turn the \odot RV20/PR-90 board fully counterclockwise.

Turn the \odot RV27/PR-90 board fully counterclockwise.
Turn the \odot RV28/PR-90 board fully counterclockwise.
Turn the \odot RV29/PR-90 board fully counterclockwise.
Turn the \odot RV30/PR-90 board fully counterclockwise.

. Adjustment procedure

Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board	Specification
G-ch	TP22 (GND: E1)	\odot RV19	A = $1.4 \pm 0.05V$
B-ch	TP23 (GND: E1)	\odot RV26	A = $1.4 \pm 0.05V$
R-ch	TP21 (GND: E1)	\odot RV12	A = $1.4 \pm 0.05V$



PR-90 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 30, manual knee adjustment.

Step 29. Gamma correction adjustment

. Notes

Step 28, PR output level adjustment must be completed before this adjustment.

. Setting

Object : Grayscale chart

To be extended: PR-90 board

Equipment: Waveform monitor (WFM)

Trigger : Pin B24/extension board

. Preparation

Set the S1 **MODE** /EN-53 board to MONI.

Set the OUTPUT switch on the side of

Set the S2 **MONITOR** /EN-53 board to G.

the camera to CAM/DCC OFF.

Set the S2 **GAMMA** /PR-90 board to ON.

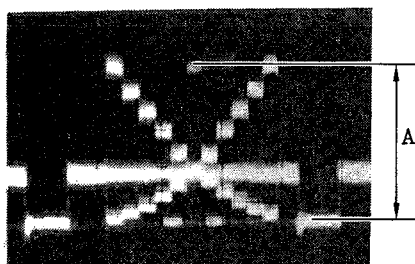
. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.

2. Test point : TP25 (GND: E1)/PR-90 board

Adjustment point: Lens iris

Specification : $A = 600 \pm 10 \text{mV}$

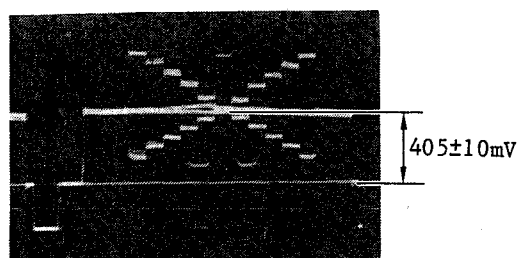


3. Test point : VIDEO OUT terminal (external)

Adjustment point:

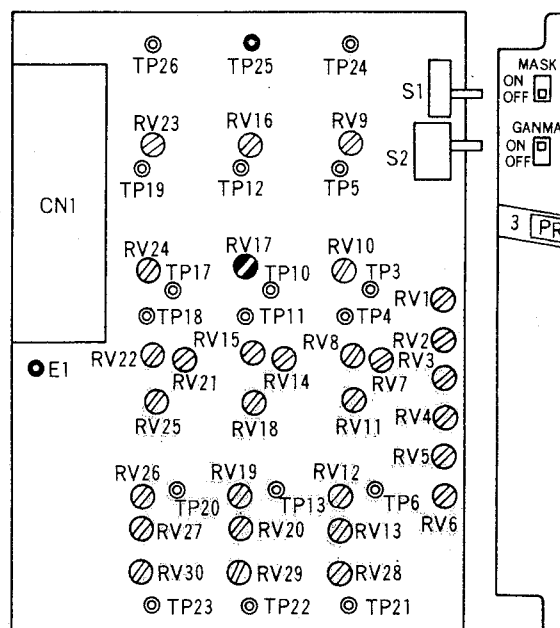
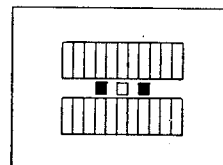
RV17/PR-90 board

Specification: Cross point level = $405 \pm 10 \text{mV}$



(Turn over the page.)

Monitor Screen

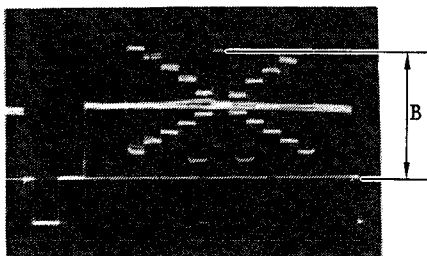


PR-90 BOARD (COMPONENT SIDE)

4. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV19/PR-90 board

Specification : $B = 700 \pm 10 \text{mV}$



5. Repeat steps 3 and 4 several times.

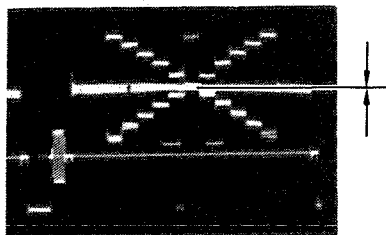
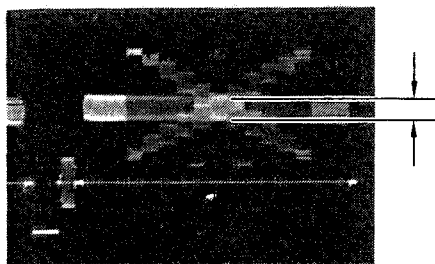
6. Set the S1 **MODE** /EN-53 board to ENC.

7. Test point : VIDEO OUT terminal
(external)

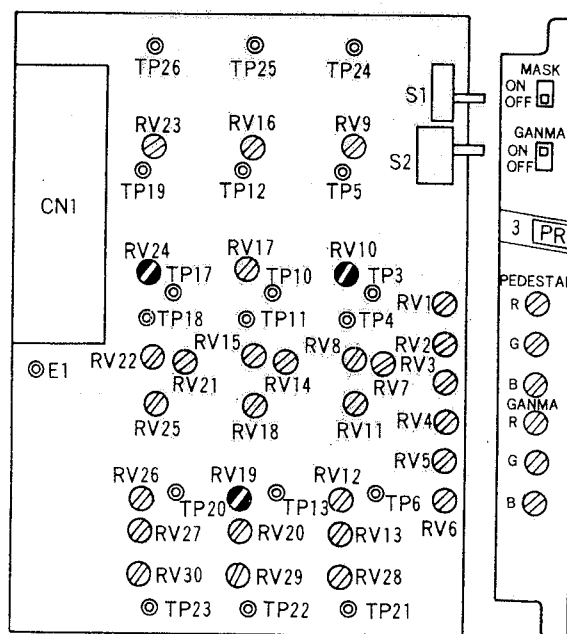
Adjustment point: RV10/PR-90 board

RV24/PR-90 board

Specification : The carrier leakage of
the cross point portion
must be minimized.



(Turn over the next page.)

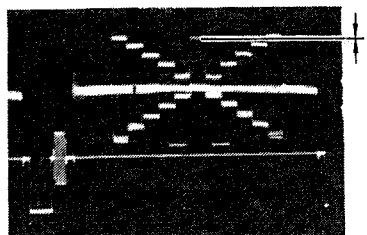
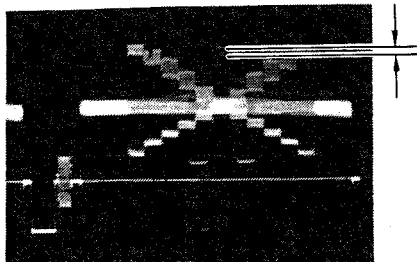


PR-90 BOARD (COMPONENT SIDE)

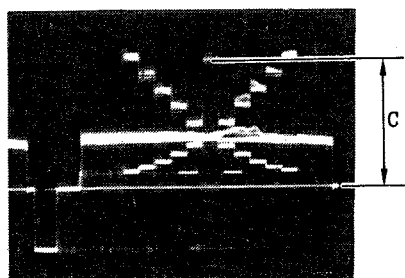
8. Test point : VIDEO OUT terminal
(external)

Adjustment point: ○RV12/PR-90 board
○RV26/PR-90 board

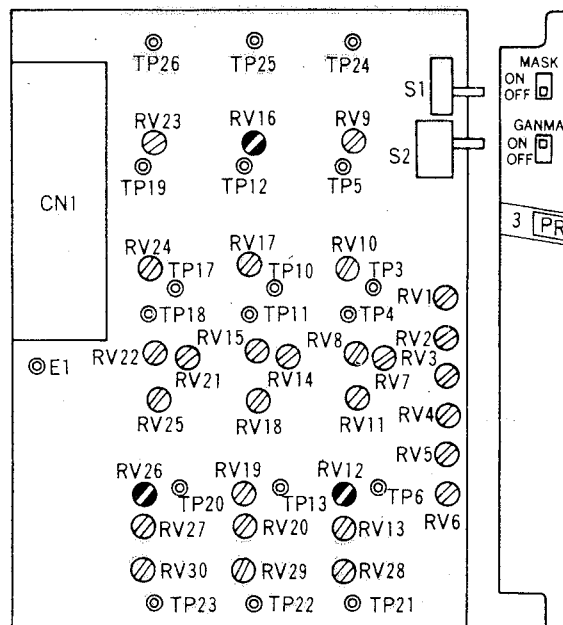
Specification : The carrier leakage of
the white level must be
minimized.



9. Repeat steps 7 and 8 several times.
10. Set the S1 **MODE** /EN-53 board to MONI.
Set the S2 **MONITOR** /EN-53 board to G.
Set the S2 **GAMMA** /PR-90 board to OFF.
11. Test point : VIDEO OUT terminal
(external)
- Adjustment point: ○RV16/PR-90 board
- Specification : $C = 700 \pm 10 \text{ mV}$



(Turn over the page.)



PR-90 BOARD (COMPONENT SIDE)

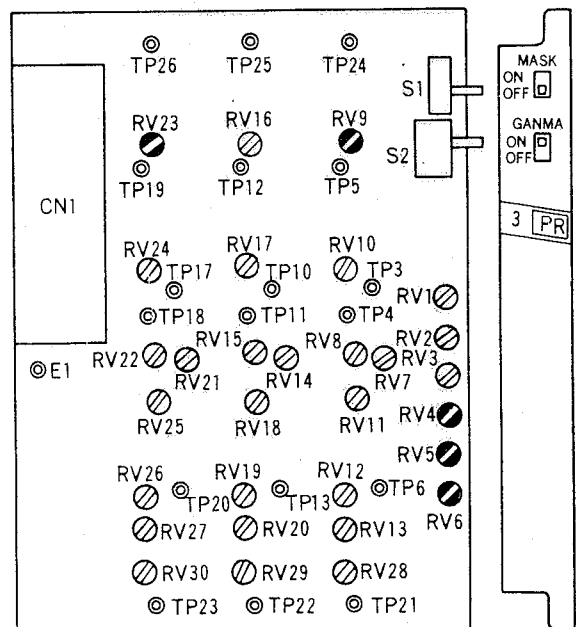
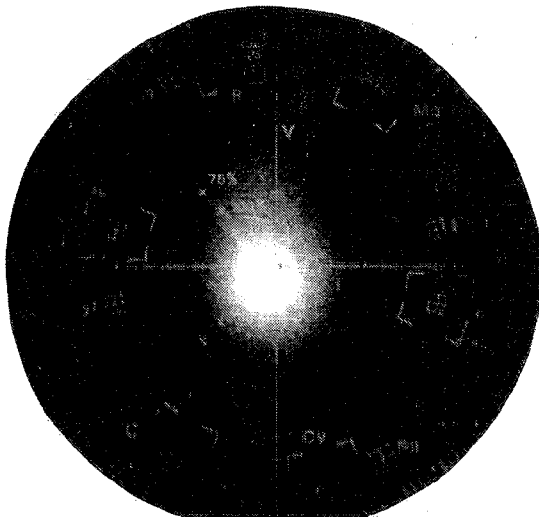
12. Set the S1 **MODE** /EN-53 board to ENC.

13. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV9, RV23/PR-90 board

Specification : The beam spot must be
in the center of the
vectorscope screen.

(At this point, the
carrier leakage of
the white peak por-
tion of the grayscale
chart must be mini-
mized on the waveform
monitor.)



PR-90 BOARD (COMPONENT SIDE)

14. Turn the RV4 **R GAMMA** /PR-90 board
fully counterclockwise. ↺

Turn the RV5 **G GAMMA** /PR-90 board
fully counterclockwise. ↺

Turn the RV6 **B GAMMA** /PR-90 board
fully counterclockwise. ↺

Set the S2 **GAMMA** /PR-90 board to ON.

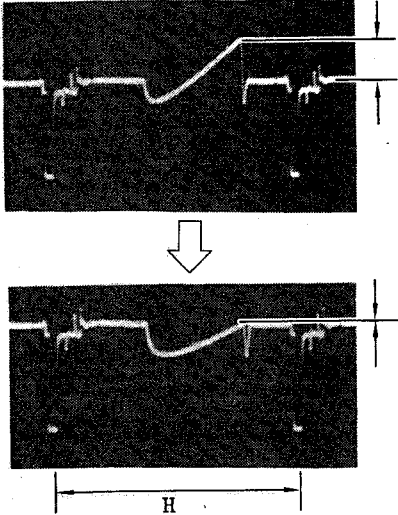
Set the S2 **TEST** /AT-46 board to ON.



(Turn over the page.)

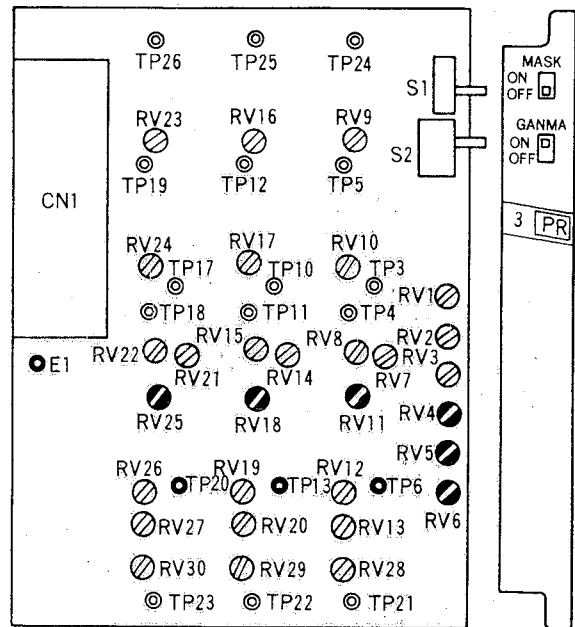
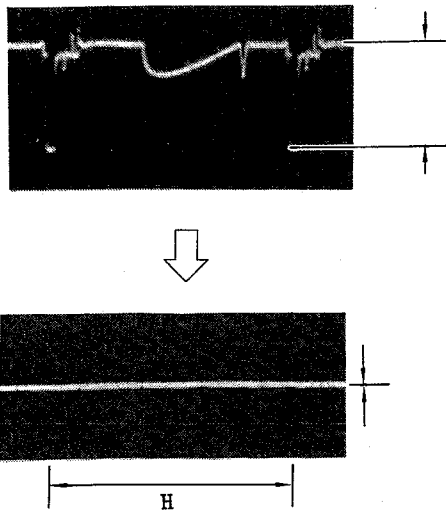
15. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board
G-ch	TP13 (GND: E1)	RV18
B-ch	TP20 (GND: E1)	RV25
R-ch	TP6 (GND: E1)	RV11



16. Adjust the G-ch, B-ch, and R-ch systems separately as follows:

	Test point/ PR-90 board	Adjustment point/ PR-90 board
G-ch	TP13 (GND: E1)	RV5 G GAMMA
B-ch	TP20 (GND: E1)	RV6 B GAMMA
R-ch	TP6 (GND: E1)	RV4 R GAMMA



PR-90 BOARD (COMPONENT SIDE)

Step 30. Manual knee adjustment

. Setting

Equipment: Waveform monitor	To be extended: PR-90 board
-----------------------------	-----------------------------

. Preparation

Set the OUTPUT switch on the side of the camera to CAM/DCC OFF.

Set the GAIN switch on the side of the camera to 9 dB.

Set the S1 **MODE** /EN-53 board to MONI.

Set the S2 **MONITOR** /EN-53 board to G.

Set the S2 **TEST** /AT-46 board to ON.

Set the S2 **GAMMA** /PR-90 board to ON.

Turn the **RV28**/PR-90 board fully counterclockwise. ⤴

Turn the **RV29**/PR-90 board fully counterclockwise. ⤴

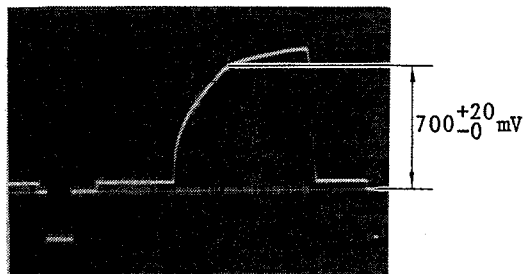
Turn the **RV30**/PR-90 board fully counterclockwise. ⤴

. Adjustment procedure

1. Test point : VIDEO OUT terminal (external)

Adjustment point: **RV20**/PR-90 board

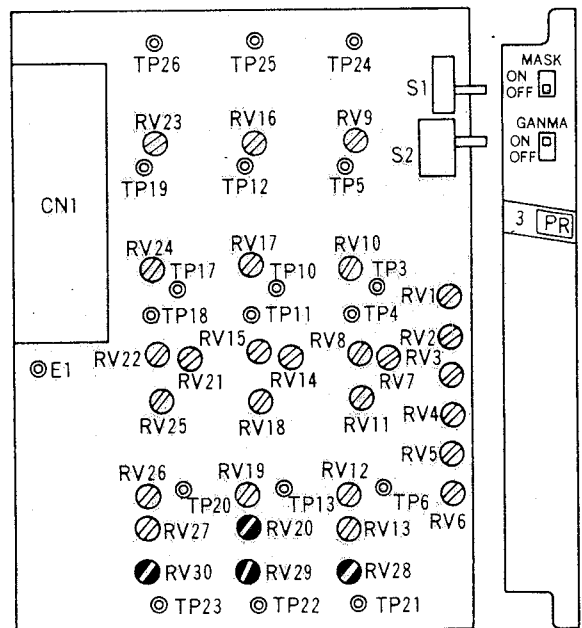
Specification : The knee of the TEST SAW waveform must be 700^{+20}_{-0} mV.



2. Set the S1 **MODE** /EN-53 board to ENC.



(Turn over the page.)



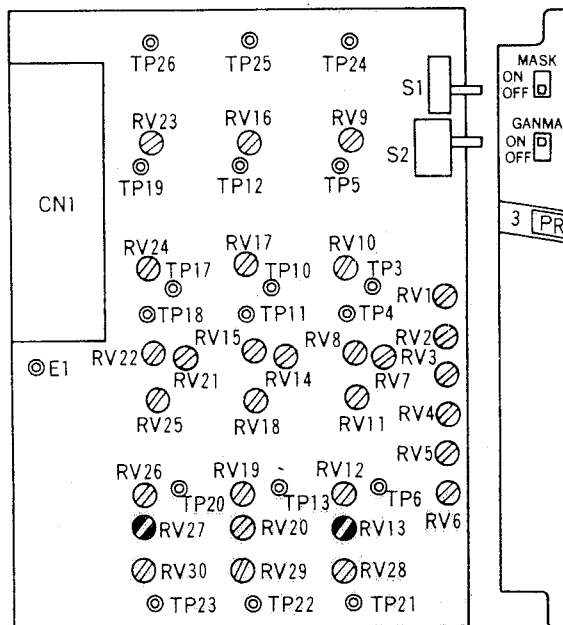
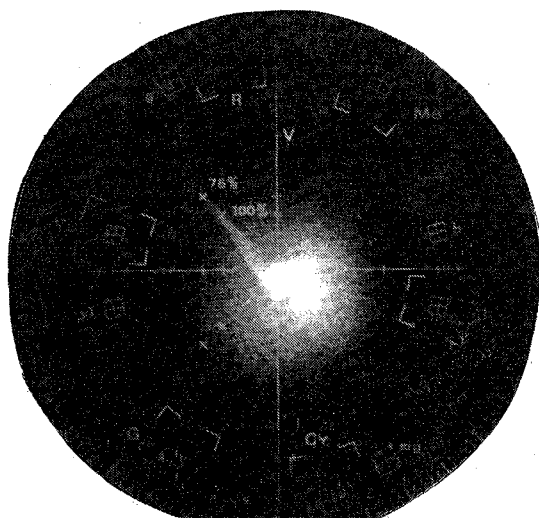
PR-90 BOARD (COMPONENT SIDE)

3. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV13 and RV27/PR-90
board

Specification : The beam spot must be
in the center of the
vectorscope screen.

(At this point, the
carrier leakage of the
knee portion of the
TEST SAW waveform must
be minimized on the
waveform monitor.)



PR-90 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 31, auto knee adjustment.

Step 31. Auto knee adjustment

. Notes

Step 30, manual knee adjustment must be completed before this adjustment.

. Setting

Equipment : Oscilloscope, waveform monitor

Trigger: Pin B22/extension board

To be extended: VA-46 board

. Preparation

Set the OUTPUT switch on the side of the camera to CAM/DCC ON.

Set the GAIN switch on the side of the camera to 9 dB.

Set the S1 **MODE** /EN-53 board to ENC.

Set the S2 **TEST** /AT-46 board to ON.

Set the S2 **GAMMA** /PR-90 board to ON.

Turn the \odot RV28/PR-90 board fully counterclockwise. \curvearrowright

Turn the \odot RV29/PR-90 board fully counterclockwise. \curvearrowright

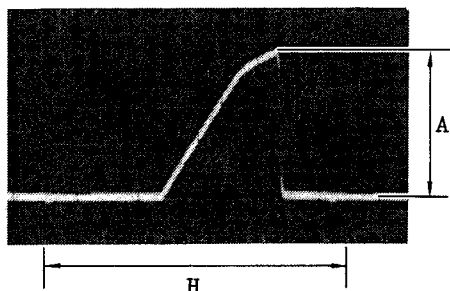
Turn the \odot RV30/PR-90 board fully counterclockwise. \curvearrowright

. Adjustment procedure

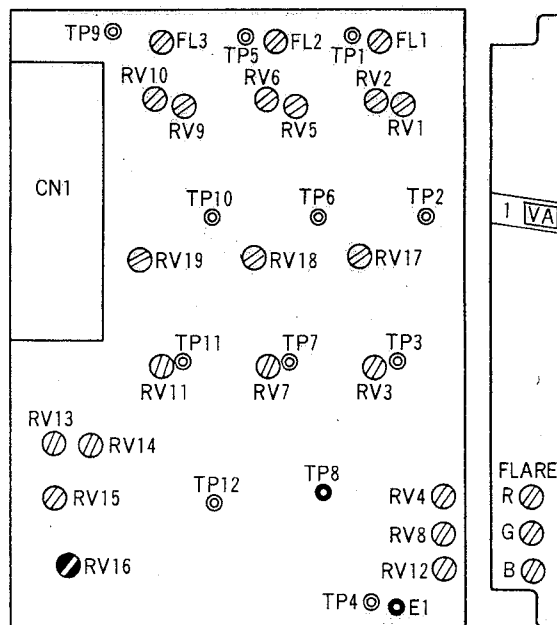
1. Test point : TP8 (GND: E1)/VA-46 board

Adjustment point: \odot RV16/VA-46 board

Specification : $A = 1.2 \pm 0.05V$



(Turn over the page.)



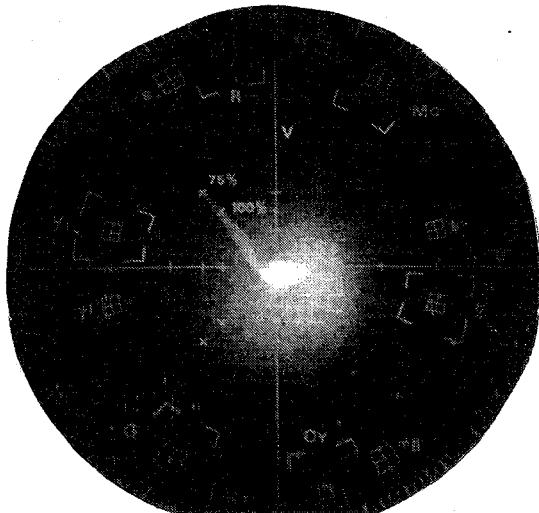
VA-46 BOARD (COMPONENT SIDE)

2. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV14 and RV15/VA-46
board

Specification : The beam spot must be
in the center of the
vectorscope screen.

(At this point, the
carrier leakage of the
knee portion of the
TEST SAW waveform must
be minimized on the
waveform monitor.)

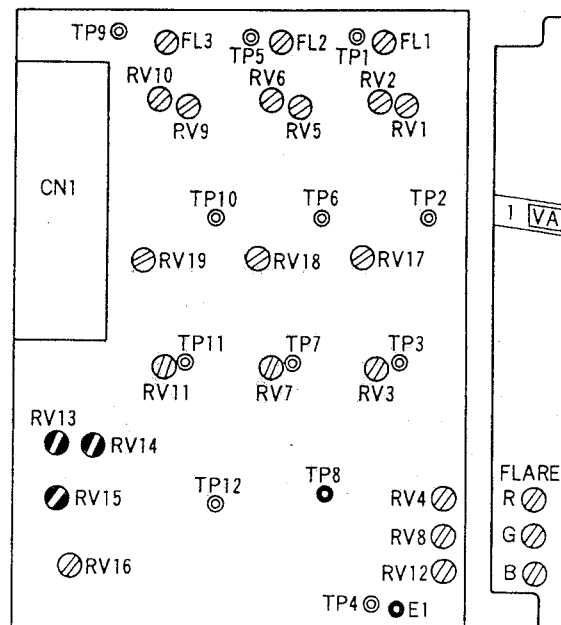
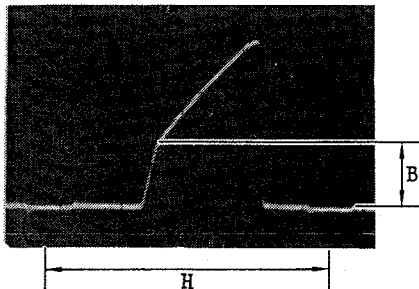


3. Set the GAIN switch on the side of the
camera to 18dB.

4. Test point : TP8 (GND: E1)/VA-46
board

Adjustment point: RV13/VA-46 board

Specification : $B = 480 \pm 10 \text{mV}$



VA-46 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 32, white clip adjustment.

Step 32. White clip adjustment

. Setting

Equipment: Waveform monitor	To be extended: PR-90 board
-----------------------------	-----------------------------

. Preparation

Set the OUTPUT switch on the side of the camera to CAM/DCC OFF.

Set the GAIN switch on the side of the camera to 18dB.

Set the S1 **MODE** /EN-53 board to MONI.

Set the S2 **MONITOR** /EN-53 board to G.

Set the S2 **TEST** /AT-46 board to ON.

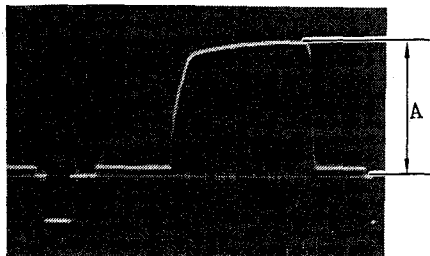
Set the S2 **GAMMA** /PR-90 board to ON.

. Adjustment procedure

1. Test point : VIDEO OUT terminal (external)

Adjustment point: RV29/PR-90 board

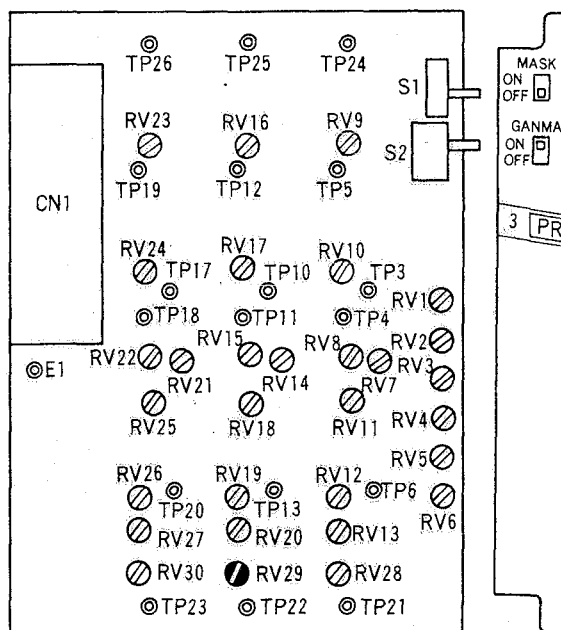
Specification : $A = 805 \pm 10 \text{mV}$



2. Set the S1 **MODE** /EN-53 board to ENC.



(Turn over the next page.)



PR-90 BOARD (COMPONENT SIDE)

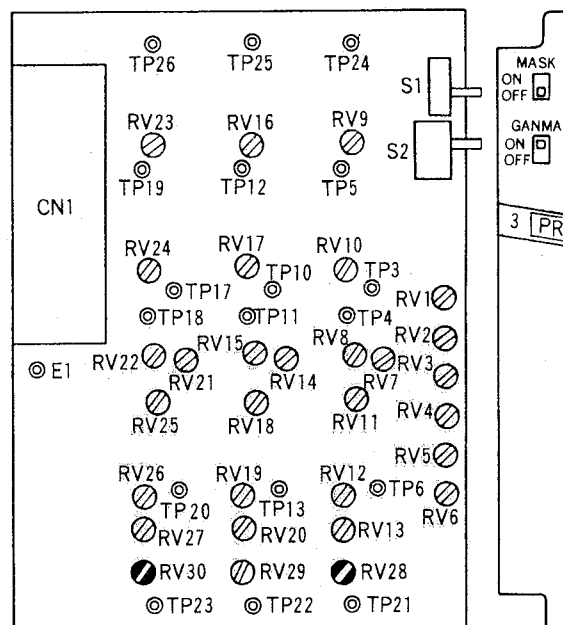
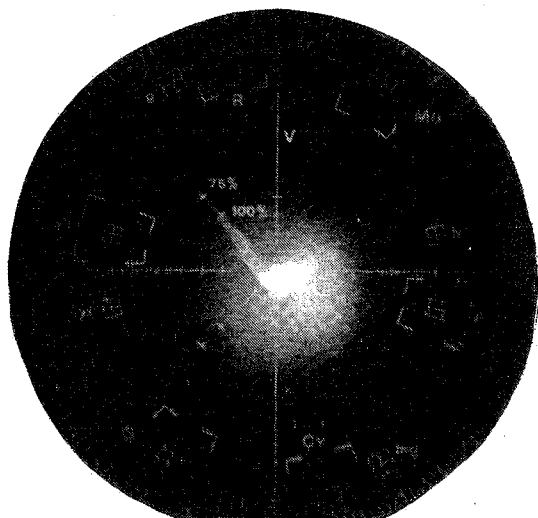
3. Test point : VIDEO OUT terminal
(external)

Adjustment point: ●RV28/PR-90 board

●RV30/PR-90 board

Specification : The beam spot must be
in the center of the
vectorscope screen.

(At this point, the
carrier leakage of the
peak portion of the
TEST SAW waveform must
be minimized on the
waveform monitor.)



PR-90 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, set the GAIN switch on the side of the camera to 0dB.

Step 33. Crispening adjustment

. Setting

Object : Grayscale chart	To be extended: IE-16 board
Equipment: Oscilloscope, waveform monitor	Trigger : Pin All/extension board

. Preparation

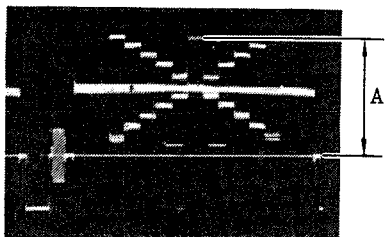
- . Set the OUTPUT switch on the side of the camera to CAM/OFF.
- . Set the FILTER selector on the side of the camera to 1 (3200°K).
- . Rotate \odot RV1 **H/V RATIO** /IE-16 board fully clockwise. \odot

. Adjustment procedure

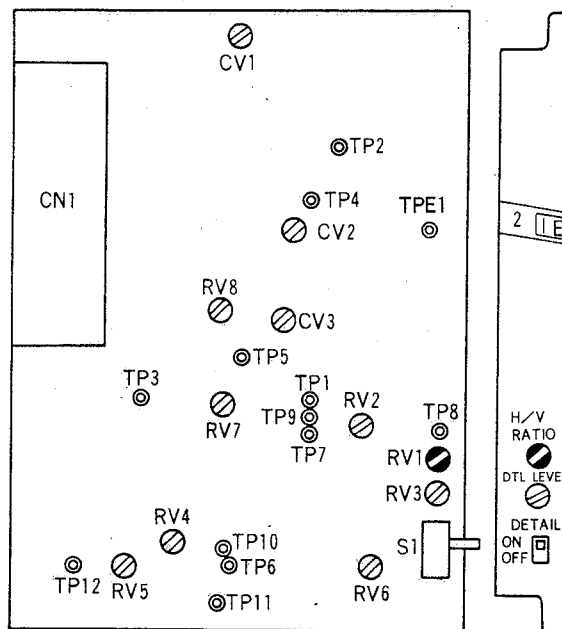
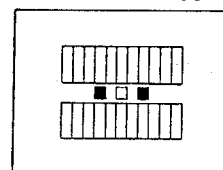
1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.
2. Test point : VIDEO OUT terminal (external)

Adjustment point: Lens iris

Specification : $A = 700 \pm 10 \text{mV}$



Monitor Screen



IE-16 BOARD (COMPONENT SIDE)

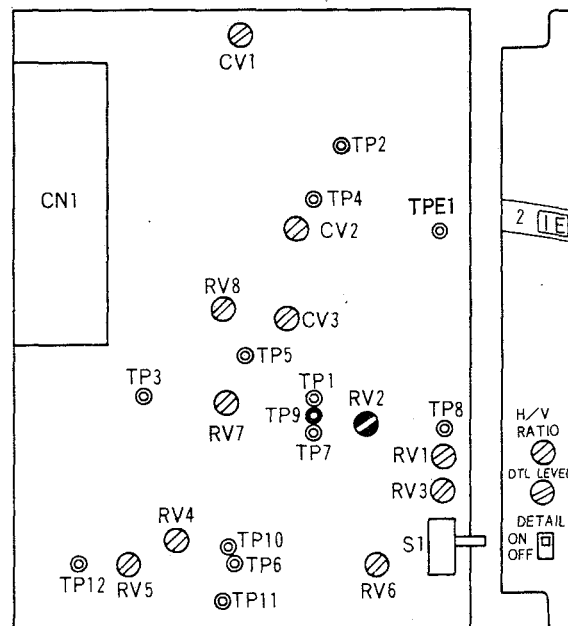
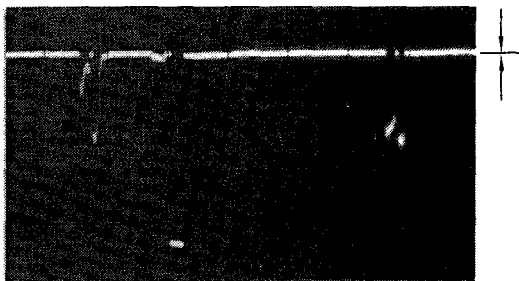
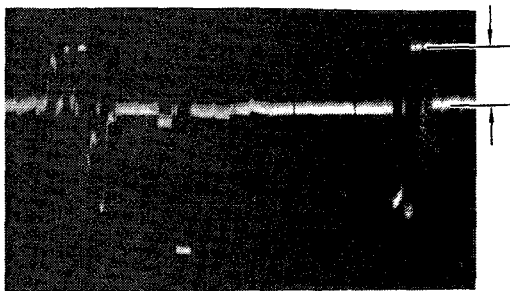
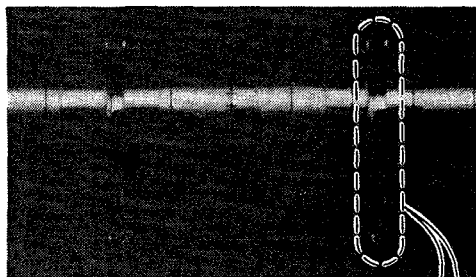


(Turn over the page.)

3. Test point : TP9 (GND: E1)/IE-16
board

Adjustment point: RV2/IE-16 board

Specification :



IE-16 BOARD (COMPONENT SIDE)

Step 34. HF offset adjustment

. Setting

Object : Multiburst chart	To be extended: IE-16 board
Equipment: Oscilloscope, waveform monitor	Trigger : Pin A21/extension board

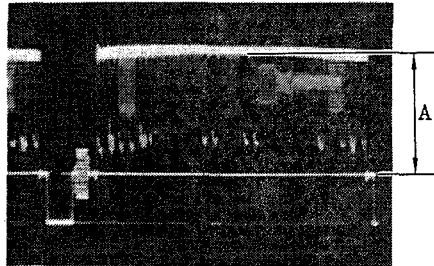
. Adjustment procedure

1. Shoot the multiburst chart, and adjust the zoom control so that the frame of the multiburst chart touches the underscanned picture frame on the monitor screen.

2. Test point : VIDEO OUT terminal (external)

Adjustment point: Lens iris

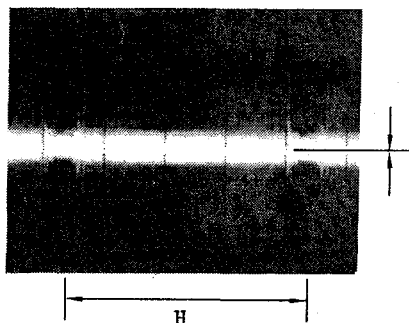
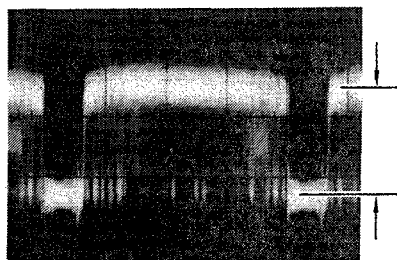
Specification : $A = 700 \pm 10 \text{mV}$



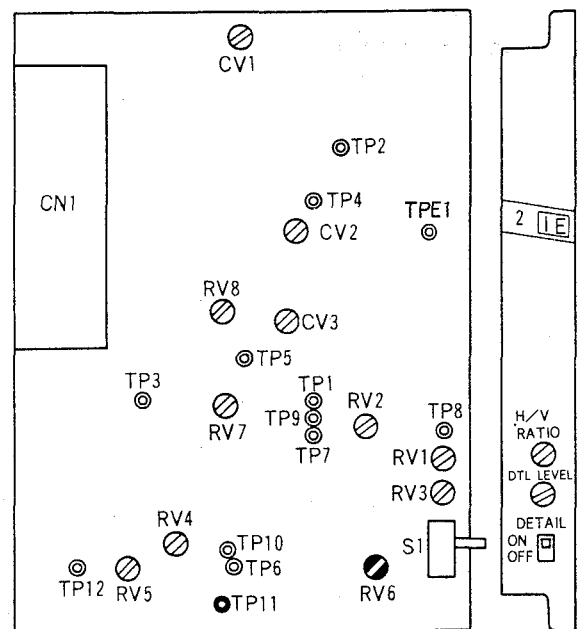
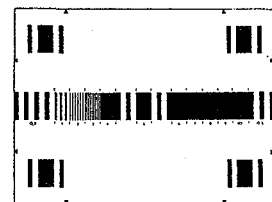
3. Test point : TP11 (GND: E1)/IE-16 board

Adjustment point: RV6/IE-16 board

Specification :



Monitor Screen




IE-16 BOARD (COMPONENT SIDE)

Step 35. HF level adjustment

. Setting

Object : Multiburst chart	To be extended: IE-16 board
Equipment: Waveform monitor	

. Preparation

- . Set the S1 **DETAIL** /IE-16 board to OFF.
- . Turn the **RV3** **DTL LEVEL** /IE-16 board fully clockwise. 

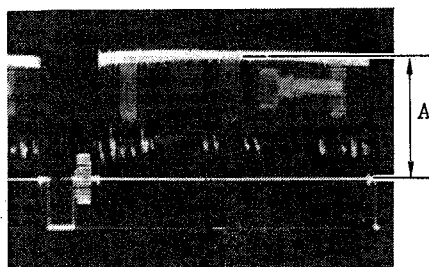
. Adjustment procedure

1. Shoot the multiburst chart, and adjust the lens control so that the frame of the multiburst chart touches the underscanned picture frame on the monitor screen.

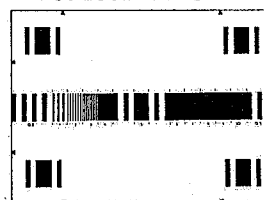
2. Test point : VIDEO OUT terminal (external)

Adjustment point: Lens iris

Specification : $A = 700 \pm 10 \text{mV}$



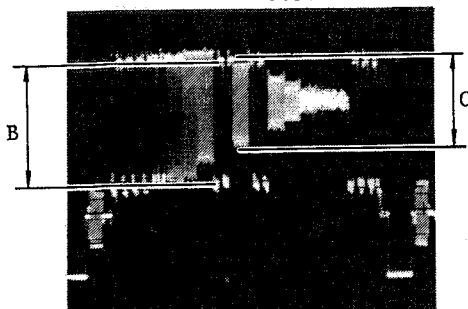
Monitor Screen



3. Test point : VIDEO OUT terminal (external)

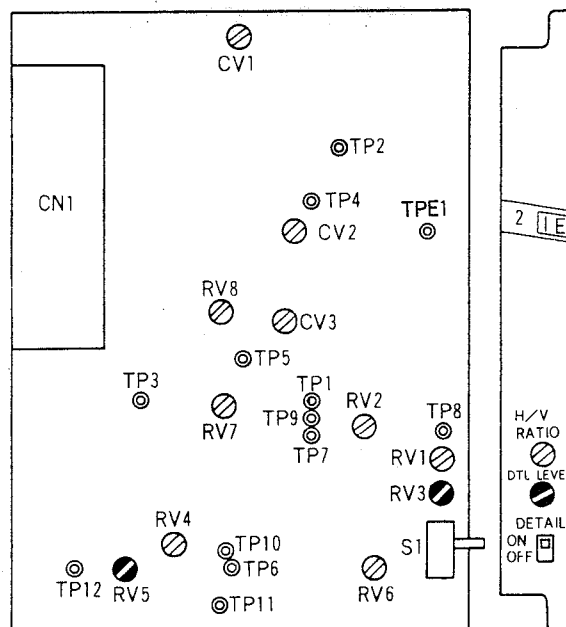
Adjustment point: **RV5**/IE-16 board

Specification : The ratio of 5MHz to 0.5MHz must be $75 \pm 5\%$.



LINE SELECTOR = VAR

$$\frac{C (5\text{MHz})}{B (0.5\text{MHz})} \times 100 = 75 \pm 5\%$$



IE-16 BOARD (COMPONENT SIDE)

Step 36. H/V RATIO adjustment


. Setting

Object: Grayscale chart

To be extended: IE-16 board

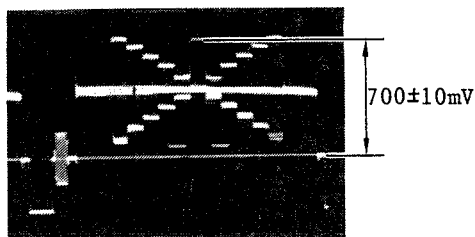
. Preparation

. Set the S1 **DETAIL** /IE-16 board to ON.

. Turn the \odot RV3/IE-16 board fully clockwise. 

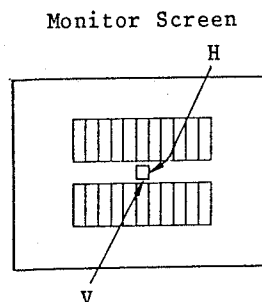
. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.
2. Adjust the lens iris so that the white level of the VIDEO OUT terminal (external) is $700 \pm 10 \text{ mV}$.

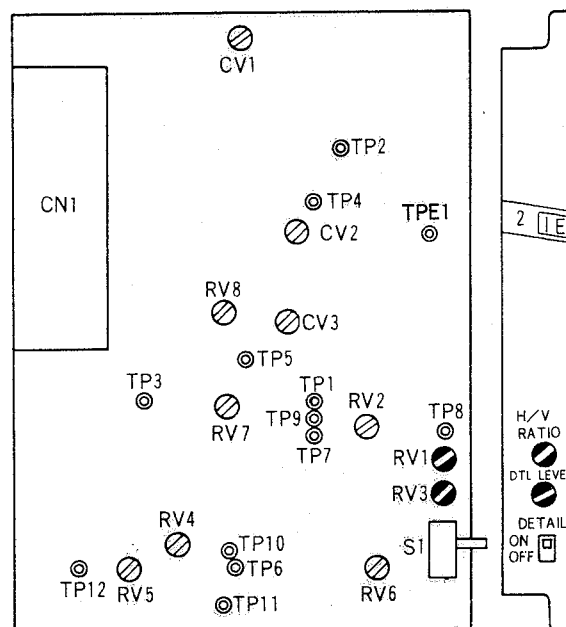
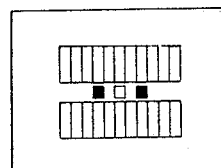


3. Adjust the lens to obtain the best focus.
4. Adjustment point: \odot RV1/IE-16 board

Specification : The overlapping detail ratio of H to V on the grayscale must be equal on the monitor screen.



Monitor Screen



IE-16 BOARD (COMPONENT SIDE)

. Notes

After this adjustment, proceed to step 38, detail amount adjustment.

Step 38. Detail amount adjustment

. Setting

Object : Multiburst chart	To be extended: IE-16 board
Equipment: Waveform monitor	

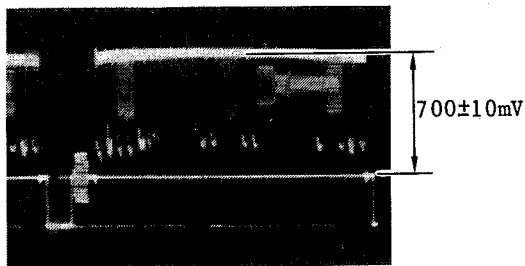
. Preparation

Set the S1 DETAIL /IE-16 board to ON.
--

. Adjustment procedure

1. Shoot the multiburst chart, and adjust the zoom control so that the frame of the multiburst chart touches the underscanned picture frame on the monitor screen.

2. Adjust the lens iris so that the white level of the VIDEO OUT terminal (external) is $700 \pm 10 \text{ mV}$.

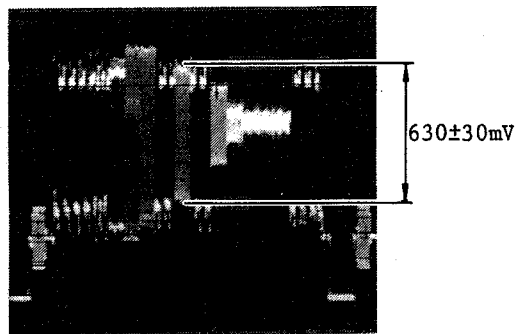


3. Adjust the lens to obtain the best focus.

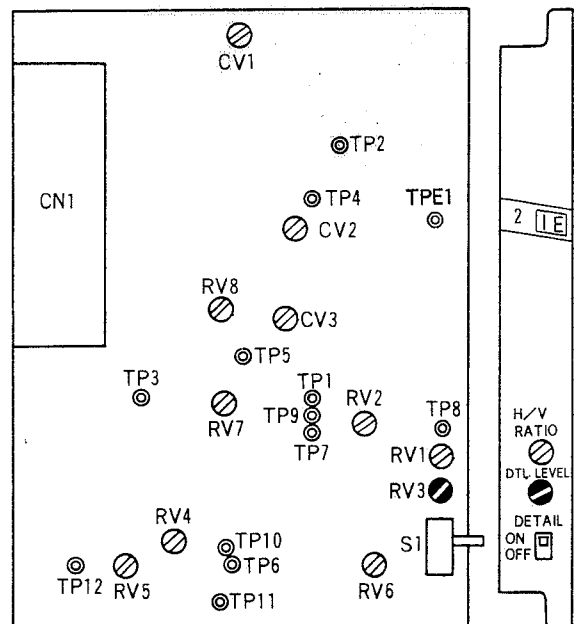
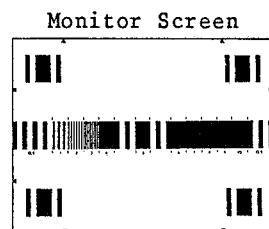
4. Test point : VIDEO OUT terminal (external)

Adjustment point: $\odot \text{RV3}$ / **DTL LEVEL** /IE-16 board

Specification : The 5MHz detail level must be $630 \pm 30 \text{ mV}$.



LINE SELECTOR = VAR



IE-16 BOARD (COMPONENT SIDE)

Step 38. Zebra level adjustment

. Setting

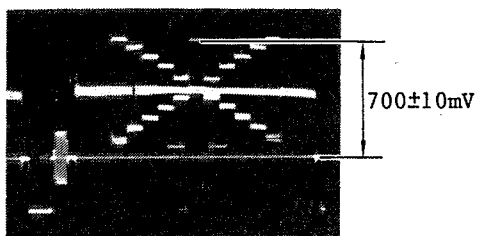
Object : Grayscale chart	To be extended: EN-53 board
Equipment: Waveform monitor (WFM)	

. Preparation

. Set the S1 MODE /EN-53 board to ENC.	. Set the S2 ZEBRA /PS-141 board to ON.
. Set the S3 switch/EN-53 board to B/W.	. Set the S2 VTR /IF-142 board to 2.

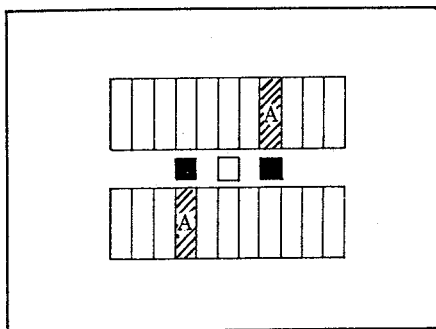
. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the undersanned picture frame on the monitor screen.
2. Adjust the iris control so that the white level of the VIDEO OUT terminal (external) is $700 \pm 10 \text{ mV}$.

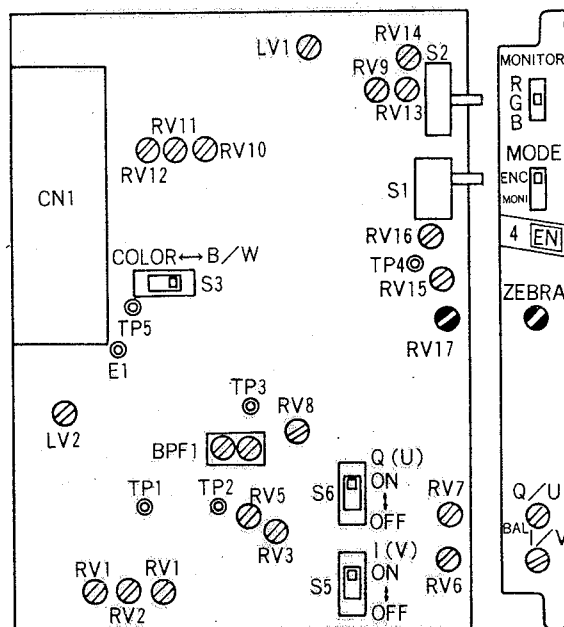
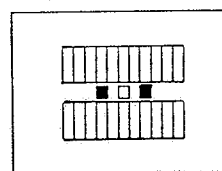


3. Adjust RV17/EN-53 board so that the zebra pattern appears on the portion A of the viewfinder screen.

Viewfinder screen



Monitor screen



EN-53 BOARD (COMPONENT SIDE)

Step 39. SYNC and SET UP level adjustment

. Setting

Equipment : Oscilloscope	Trigger: Pin B20/extension board
To be extended: IF-142 board	

. Preparation

- . Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
- . Set the S1 **OUTPUT** /IF-142 board to AUTO.

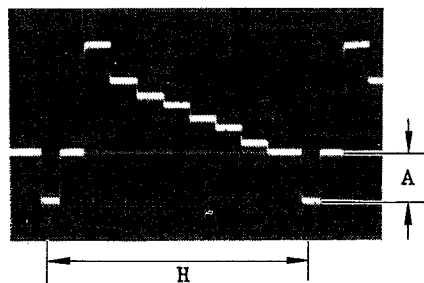
. Adjustment procedure

[For PAL]

Test point : Pin A25 (GND: Pin A2)/
extension board

Adjustment point: \odot RV6/IF-142 board

Specification : $B = 600 \pm 10 \text{ mV}$



[For PAL-M]

1. Test point : Pin A25 (GND: Pin A2)/
extension board

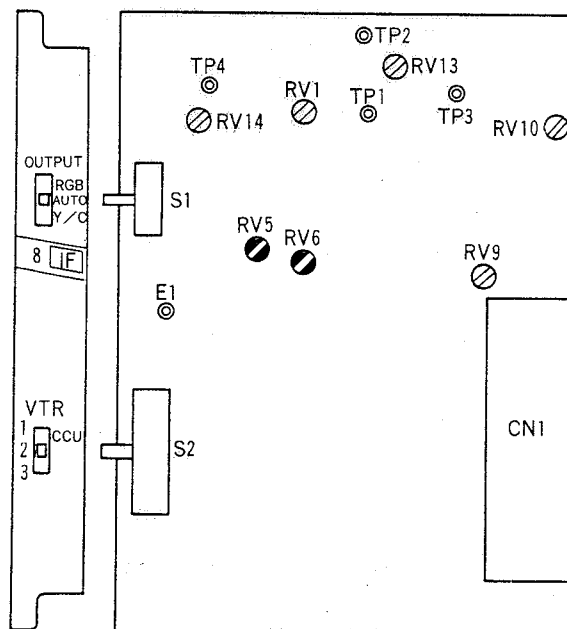
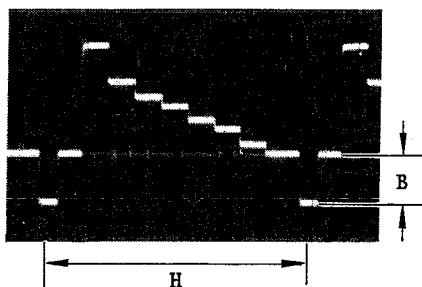
Adjustment point: \odot RV5/IF-142 board

Specification : $A = 53 \pm 5 \text{ mV}$

2. Test point : Pin A25 (GND: Pin A2)/
extension board

Adjustment point: \odot RV6/IF-142 board

Specification : $B = 600 \pm 10 \text{ mV}$



IF-142 BOARD (COMPONENT SIDE)

Step 40. VTR Y level adjustment

. Setting

Equipment : Oscilloscope	Trigger: Pin B20/extension board
To be extended: IF-142 board	

. Preparation

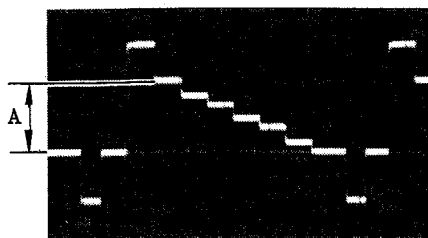
- Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
- Set the S1 **OUTPUT** /IF-142 board to AUTO.

. Adjustment procedure

- Test point : Pin A25 (GND: Pin A2)/
extension board

Adjustment point: \odot RV5/IF-142 board

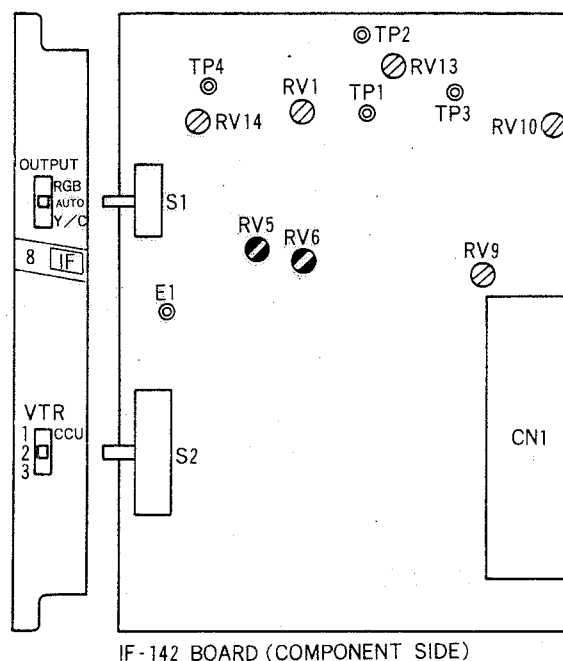
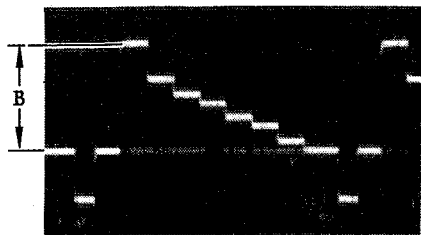
Specification : $A = 940 \pm 20 \text{ mV}$



- Test point : Pin A25 (GND: Pin A2)/
extension board

Adjustment point: \odot RV6/IF-142 board

Specification : $B = 1.4 \pm 0.02 \text{ V}$



Step 42. VTR B-Y level adjustment

. Setting

Equipment : Oscilloscope
To be extended: IF-142 board

Trigger: Pin B20/extension board

. Preparation

- . Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
- . Set the S1 ☐ OUTPUT /IF-142 board to AUTO.

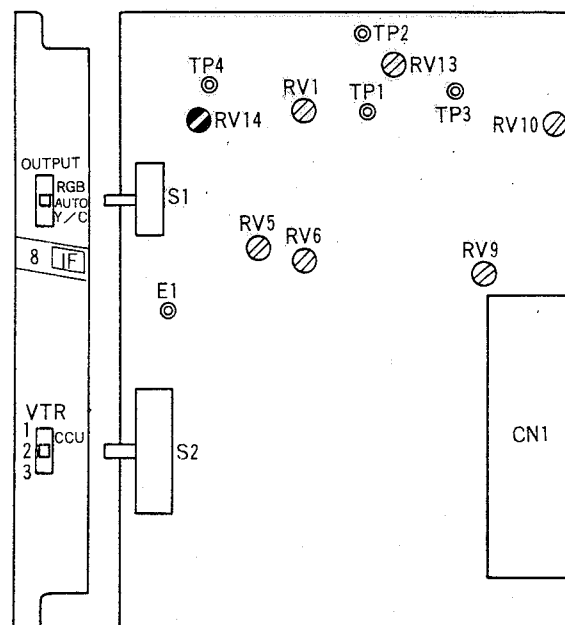
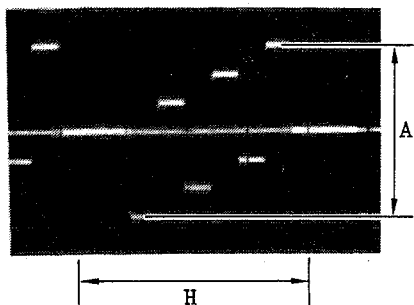
. Adjustment procedure

Test point : Pin A27 (GND: Pin A2)/
extension board

Adjustment point: ☒ RV14/IF-142 board

Specification : $A = 1.05 \pm 0.02V$ (PAL)

$A = 1.4 \pm 0.02V$ (PAL-M)



IF-142 BOARD (COMPONENT SIDE)

Step 43. SEP-ed Y level adjustment

. Setting

Equipment : Oscilloscope	Trigger: Pin B20/extension board
To be extended: IF-142 board	

. Preparation

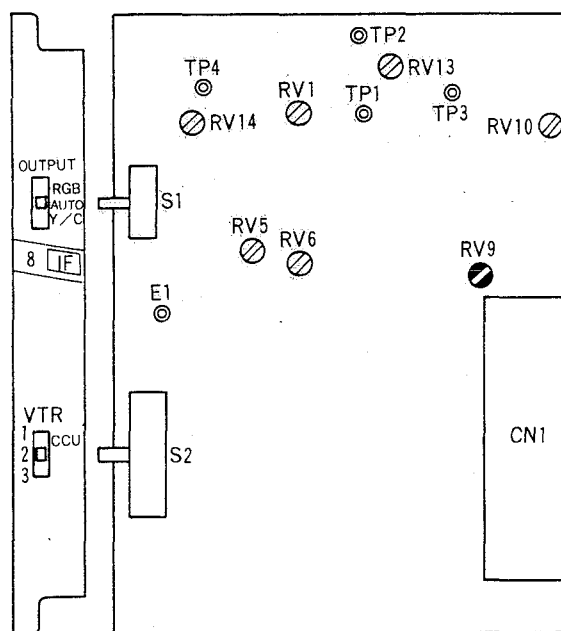
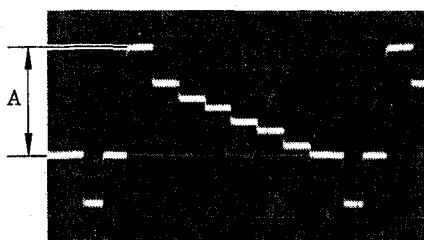
- . Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.
- . Set the S1 **OUTPUT** /IF-142 board to Y/C.

. Adjustment procedure

Test point : Pin A25 (GND: Pin A2)/
extension board

Adjustment point: RV9/IF-142 board

Specification : $A = 1.4 \pm 0.02V$



IF-142 BOARD (COMPONENT SIDE)

Step 44. SEP-ed CHROMA level adjustment

. Setting

Equipment : Oscilloscope	Trigger: Pin B20/extension board
To be extended: IF-142 board	

. Preparation

. Set the OUTPUT switch on the side of the camera to BARS/DCC OFF.

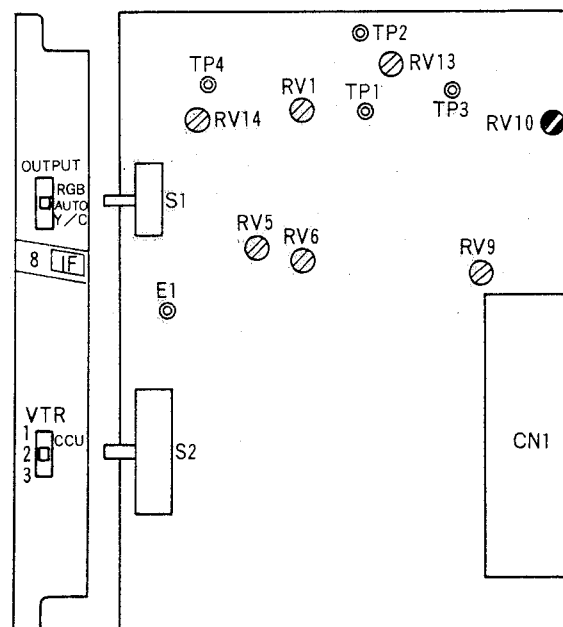
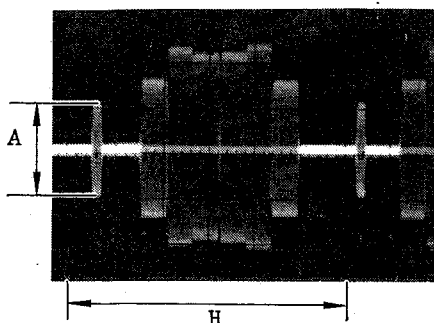
. S1 **OUTPUT** /IF-142 board: "Y/C"

. Adjustment procedure

Test point : Pin A26 (GND: Pin A2)/
extension board

Adjustment point: RV10/IF-142 board

Specification : Burst level "A" = $600 \pm 20\text{mV}$



IF-142 BOARD (COMPONENT SIDE)

Step 45. Resolution adjustment**. Setting**

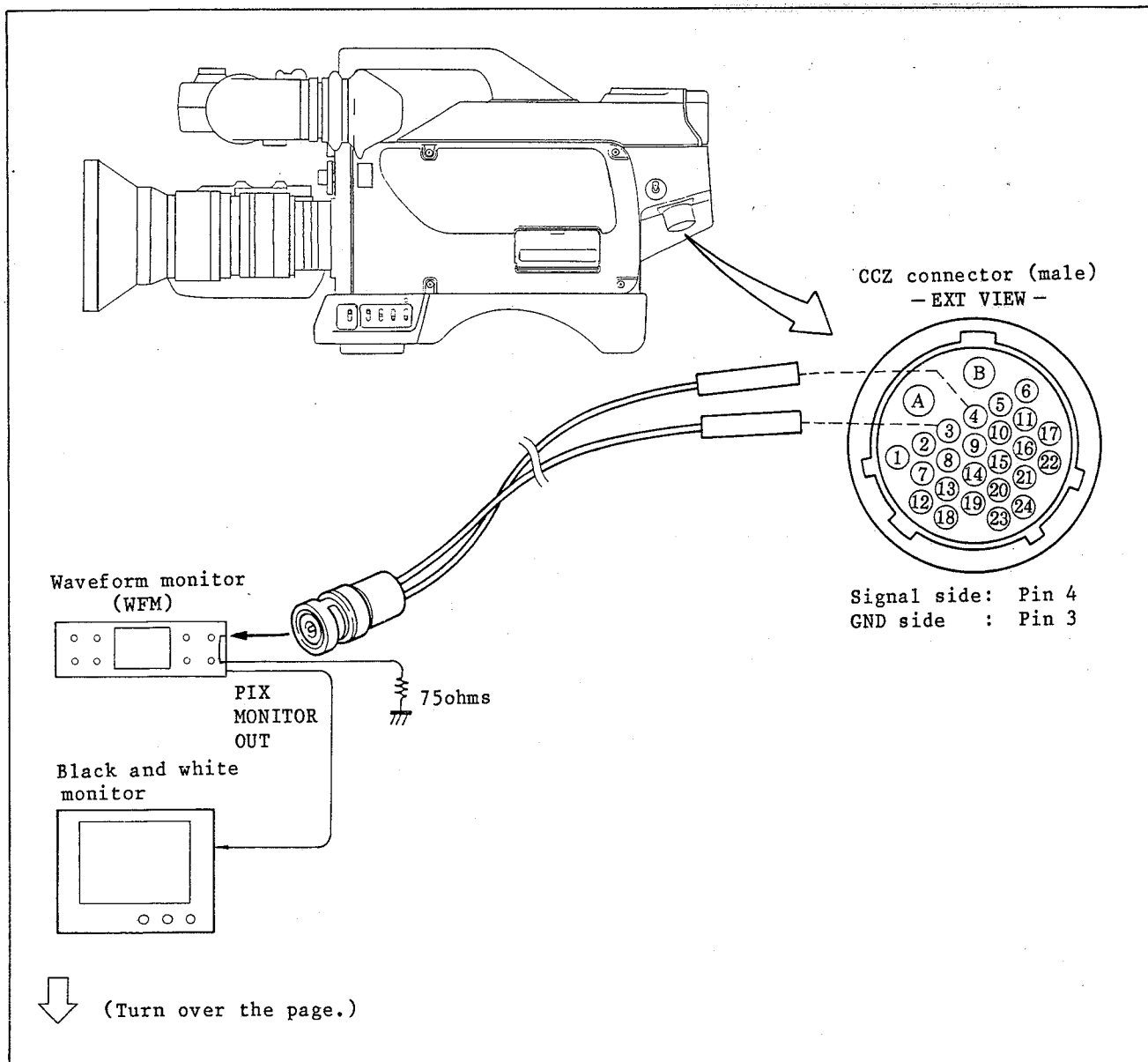
Object: Resolution chart

Equipment: Waveform monitor

. Preparation

Set the OUTPUT switch on the side of the camera to CAM/DCC OFF.

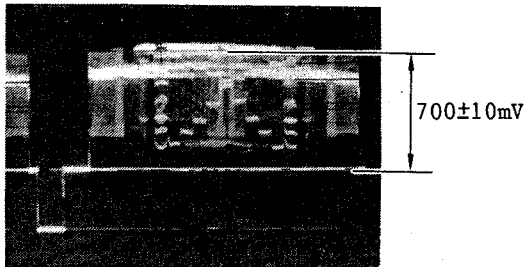
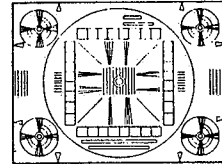
Set the GAIN switch on the side of the camera to 0dB.

Set the S1 **OUTPUT**/IF-142 board to AUTO.**. Connection diagram**

. Adjustment procedure

1. Shoot the resolution chart, and adjust the zoom control so that the frame of the resolution chart touches the underscanned picture frame on the monitor screen.
2. Adjust the iris control so that the white level of the VIDEO OUT terminal (external) is $700 \pm 10\text{mV}$.

Monitor Screen



3. Waveform monitor switch setting

- . DISPLAY switch : "2FIELD"



- . LINE SELECTION switch: "VAR"



- . Adjust the VAR control of the LINE selector so that the select line positions on the 700th line of the horizontal resolution on the resolution chart.



- . Switch the DISPLAY switch from 2FIELD to 10.

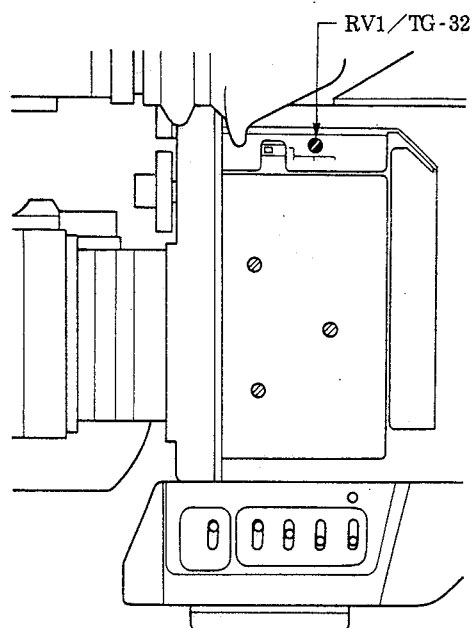
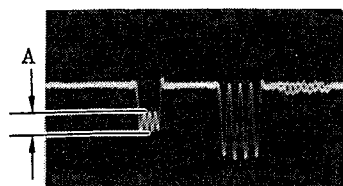
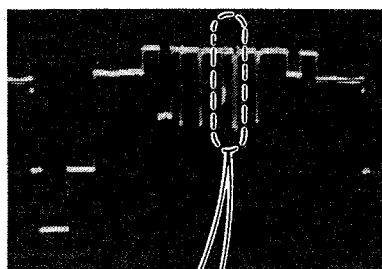


(Turn over the page.)

4. Test point : VIDEO OUT terminal
(external)

Adjustment point: RV1/TG-32 board

Specification : $A = 35 \pm 10 \text{mV}$



Step 46. Auto iris adjustment

. Setting

Object : Grayscale chart
Equipment: Waveform monitor

To be extended: AT-46 board

. Preparation

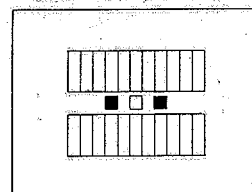
1. Set the S1 MODE /EN-53 board to ENC.

Set the OUTPUT switch on the side of the camera to CAM/DCC ON.

Set the lens control AUTO/MANU switch to AUTO.

2. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.

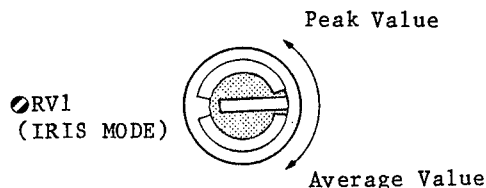
Monitor Screen



. Adjustment procedure

1. Iris mode adjustment

The iris drive mode can be changed from the average value drive of the video signal to the peak value drive with \odot RV1/AT-46 board. Adjust it according to use. Generally, set it to the mechanical center.

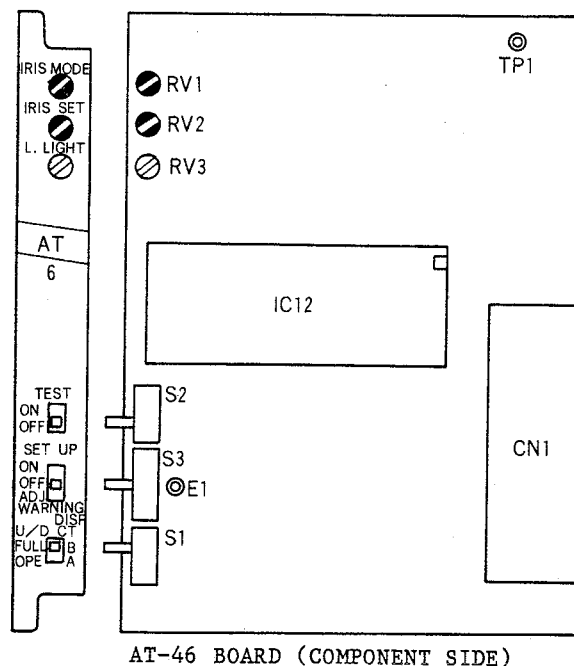
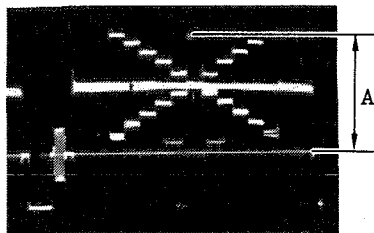


2. Iris level adjustment

Test point : VIDEO OUT terminal
(external)

Adjustment point: \odot RV2/AT-46 board

Specification : $A = 700 \pm 10\text{mV}$



. Notes

After the adjustment, set the iris control AUTO/MANU switch to MANU and the OUTPUT switch on the side of the camera to CAM/DCC OFF.

Step 47. LOW VIDEO adjustment

. Setting

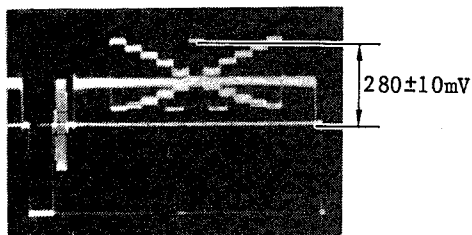
Object: Grayscale chart	Equipment: Waveform monitor
-------------------------	-----------------------------

. Preparation

Set the S1 MODE /EN-53 board to ENC.

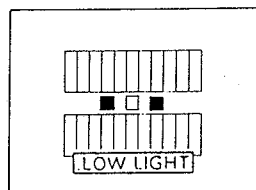
. Adjustment procedure

1. Shoot the grayscale chart, and adjust the zoom control so that the frame of the grayscale chart touches the underscanned picture frame on the monitor screen.
2. Adjust the iris control so that the white level of the VIDEO OUT terminal (external) is $280 \pm 10 \text{mV}$.

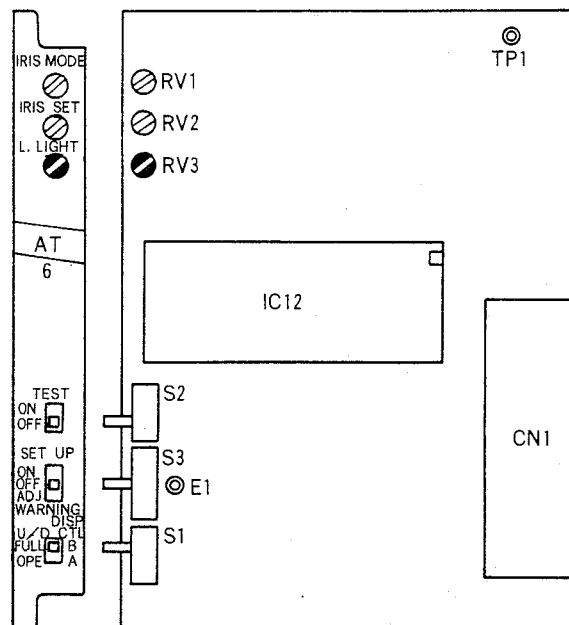
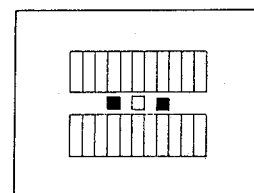


3. Adjust the RV3/AT-46 board so that the point where the characters, "LOW LIGHT" start blinking on the viewfinder screen is set.

Viewfinder screen



Monitor Screen

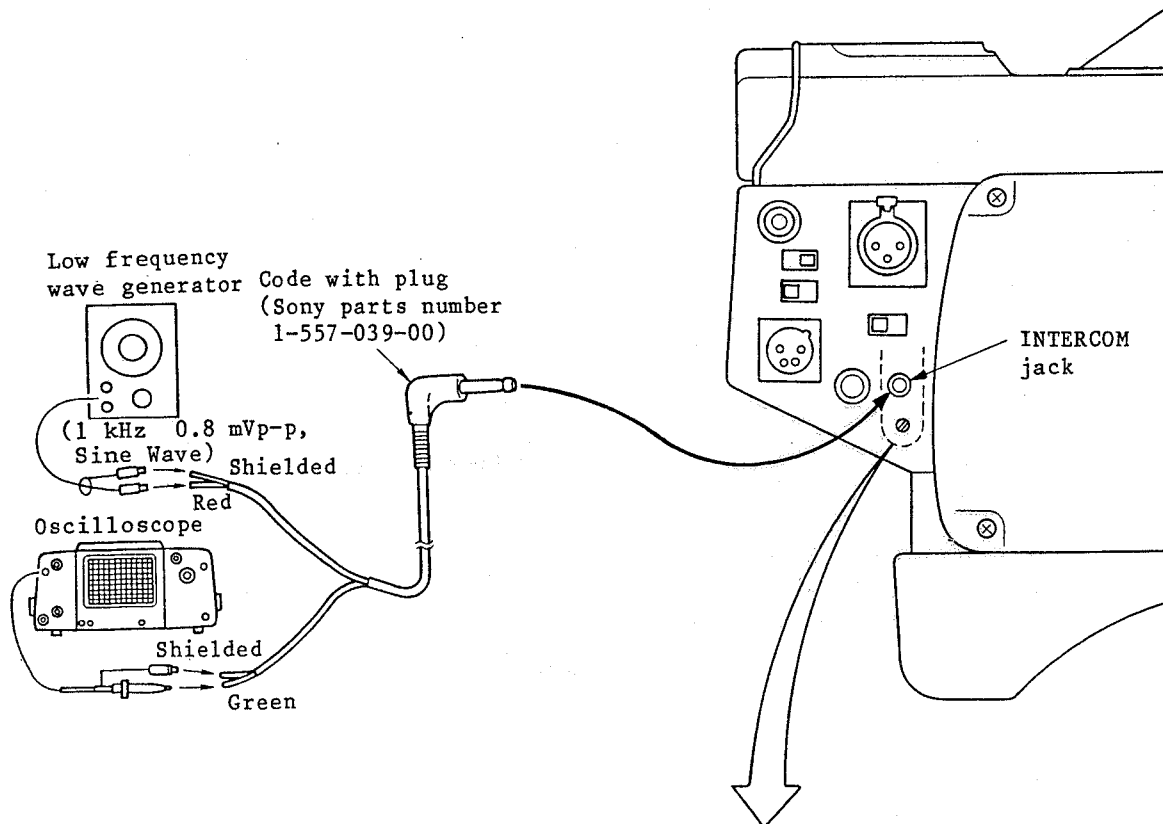


AT-46 BOARD (COMPONENT SIDE)

Step 48. SIDE TONE adjustment

. Preparation

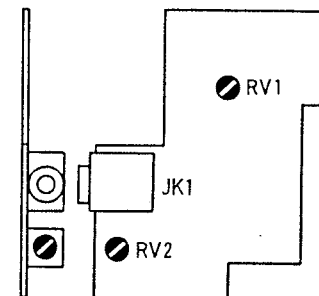
Connection:



Variable register setting

Turn the \odot RV1/AA-31 board fully counterclockwise. \odot

Turn the \odot RV2/AA-31 board fully clockwise. \odot



AA-31 board
(Component side)



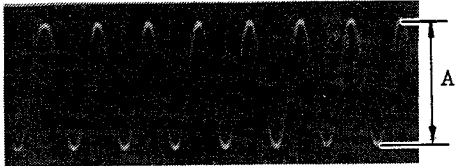
(Turn over the page.)

. Adjustment procedure

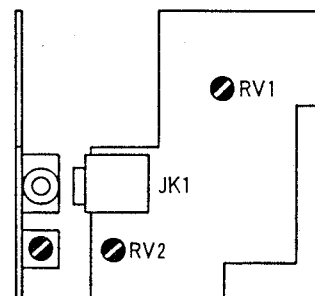
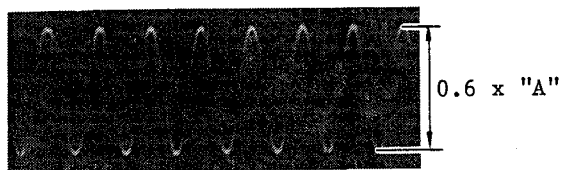
Test point: Intercom phone jack

Adjustment:

1. Measure the output level "A" of the intercom phone jack.



2. Adjust the RV1/AA-31 board so that the output level of the intercom phone jack is 60% of "A" measured in step 1.



AA-31 BOARD
(COMPONENT SIDE)

3-3. PARTIAL ADJUSTMENT

The adjustments of the DXC-M7P/M7PM can be mainly classified into the following:

- . Power supply system
- . Synchronization signal system
- . Video signal system
- . Interface system
- . Auto control system
- . Income system

(For details, see page 4-12.)

Therefore, the partial adjustment can be performed for each signal system, except in the following case:

Exception: (If the +9.5V/9V adjustment for the power supply system has been performed, reperform all items of the overall adjustment.)

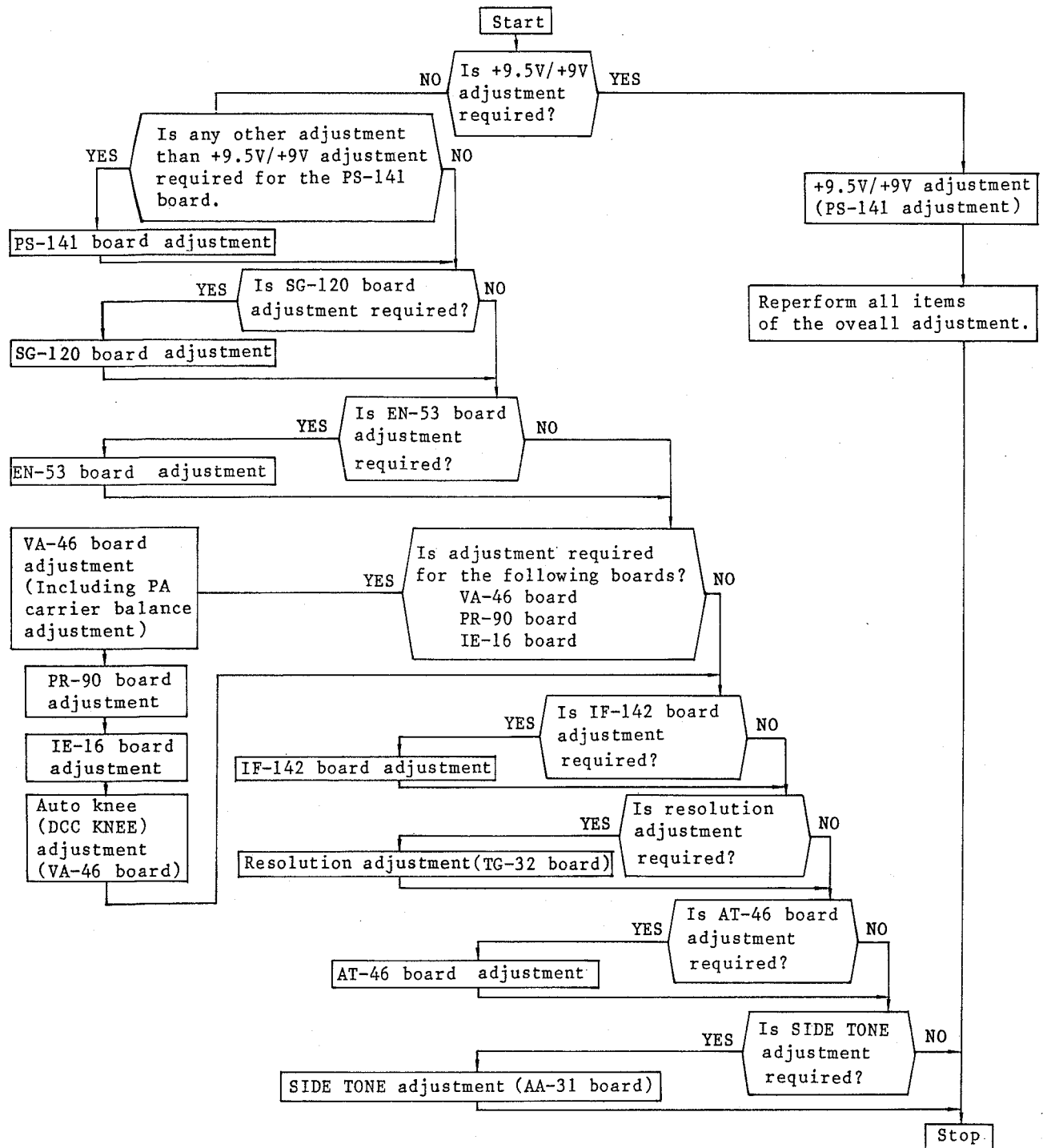
To perform a partial adjustment, be sure to refer to the following sections.

3-1-3. Initial Setting

3-1-4. Notes on Adjustment

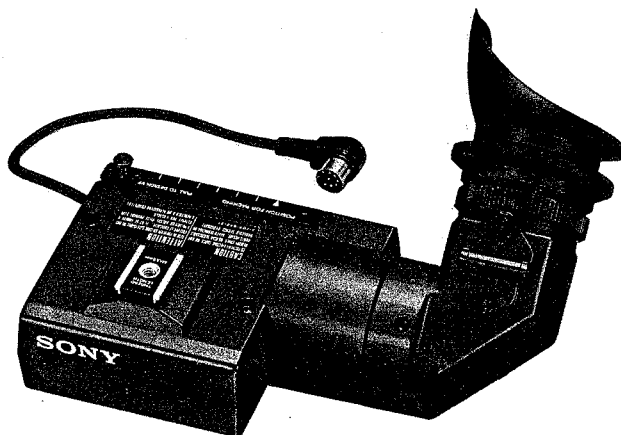
3-3-1. Partial Adjustment Flowchart for Each Board

Figure 3-1 is a flowchart for the partial adjustment for each board.



[Fig. 3-1]

1.5-INCH ELECTRONIC VIEWFINDER

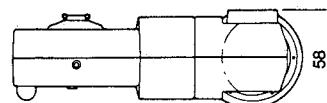
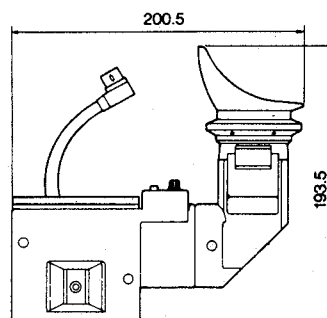


SPECIFICATION

Picture tube	1.5-inch monochrome
Indicators	REC/TALLY indicator BATT indicator GAIN UP indicator
Resolution	400 lines
Power requirements	12 V DC
Power consumption	2.3 W
Weight	Approx. 600 g (1 lb 5 oz)
Dimensions	Approx. 201 × 68 × 184 mm (w/h/d) (7 ⁷ / ₈ × 2 ¹¹ / ₁₆ × 7 ¹ / ₄ inches)
Supplied accessory	Operating Instructions (1)

Dimensions

Unit: mm
(inches)



Design and specifications subject to change without notice.

SONY[®]

SERVICE MANUAL

The DXF-M7/M7CE is a 1.5-inch monochrome electronic viewfinder designed to be used with the Sony DXC-M7/M7P series color video camera. This instruction manual is for both the DXF-M7 and the DXF-M7CE. The operating instructions for both viewfinders are the same, but their signal systems and their color video cameras to be connected are different.

	Signal system	Color video camera
DXF-M7	EIA standards, NTSC color system	DXC-M7 series camera
DXF-M7CE	CCIR standards, PAL color system	DXC-M7P series camera

Please refer to the camera's instruction manual for the viewfinder's operation.

Precautions

Operation

- Do not use the unit in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Do not point the viewfinder directly at the sun, or the plastics inside the viewfinder may be damaged.
- Do not use the viewfinder outside the temperature extremes of -10°C to $+45^{\circ}\text{C}$ (14°F to 113°F).
- Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Allow adequate air circulation to prevent internal heat build-up.
- Do not expose the unit to the extremely high temperature and humidity.

Cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

Repacking

Do not discard the carton. It affords maximum protection whenever the unit is transported.

Table of Contents

VOL. 1

1. GENERAL DESCRIPTION

- 1-1. Location and Function of Controls 1-1
- 1-2. How to Attach to the Camera 1-2
- 1-3. For Easy Operation of the Viewfinder 1-3
- 1-4. Diopter Adjustment (Adjustable Range:
From -1D to -3D) 1-4
- 1-5. Operation 1-4

2. SERVICE INFORMATION

- 2-1. Replacement of the Viewfinder CRT 2-1
- 2-2. Replacement of the Deflection Yoke 2-4

3. ALIGNMENT

- 3-1. Preparation 3-1
 - 3-1-1. Equipment Required 3-1
 - 3-1-2. How to Make the VF Extension
Cable 3-1
- 3-2. Connection and Initial Setting 3-2
 - 3-2-1. Initial Setting 3-2
- 3-3. VF System Adjustment 3-3
 - 3-3-1. 9 V Adjustment 3-3
 - 3-3-2. Focus Adjustment 3-3
 - 3-3-3. Horizontal Hold Adjustment 3-3
 - 3-3-4. Vertical Hold Adjustment 3-3
 - 3-3-5. Deflection Yoke Tilt Adjustment 3-4
 - 3-3-6. V-H Deflection Size Adjustment 3-4
 - 3-3-7. Centering Adjustment 3-5
 - 3-3-8. FB Pulse Wide Adjustment 3-5
 - 3-3-9. Blight Calibration Adjustment 3-5

VOL. 2

4. BLOCK DIAGRAMS

5. SEMICONDUCTOR

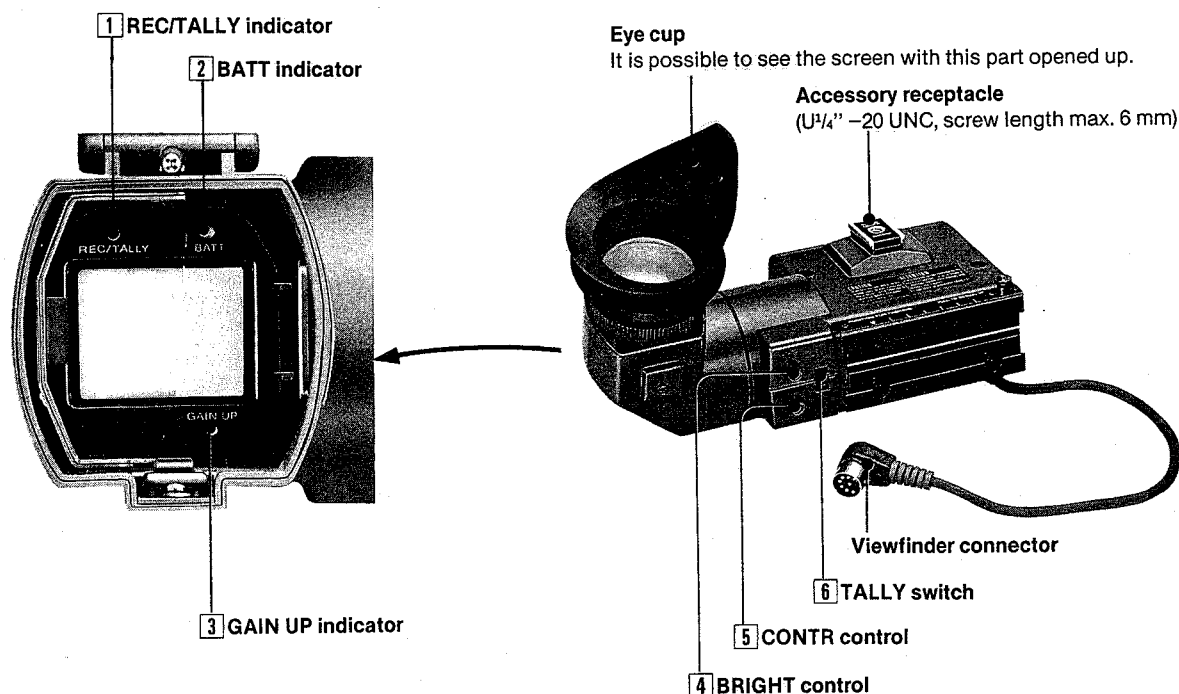
6. SCHEMATIC DIAGRAMS AND BOARD ILLUSTRATIONS

7. SPARE PARTS

SECTION 1

GENERAL DESCRIPTION

1-1. LOCATION AND FUNCTION OF CONTROLS



1 REC/TALLY indicator

Illuminates during recording with one camera, and illuminates when the camera's picture is selected by a control console, a video switcher, etc., connected to the CCU-M7/M7P camera control unit which is connected to the camera. The indicator blinks in accordance with the warning system of the VTR.

2 BATT (battery) indicator

Starts blinking several minutes before the battery of the camera or the VTR is discharged to a level at which it cannot power the camera or the VTR (about 11 V), and illuminates steadily when the battery has discharged to that level.

3 GAIN UP indicator

Lights up when the GAIN selector is set to the 9 dB or 18 dB position.

4 BRIGHT (brightness) control *

Adjusts the brightness of the picture on the viewfinder screen. To obtain a brighter picture, turn this control clockwise.

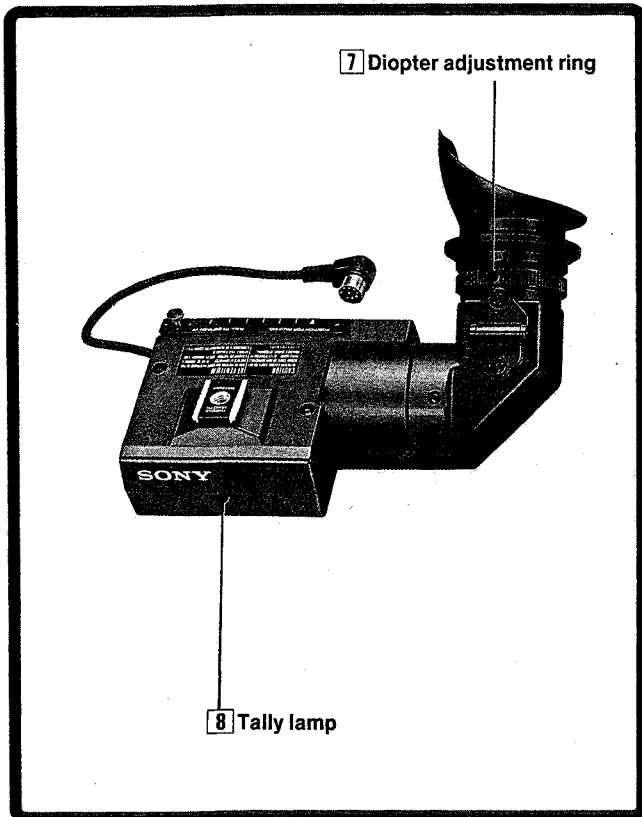
5 CONTR (contrast) control *

Adjusts the contrast of the picture on the viewfinder screen.

6 TALLY switch

The tally lamp 8 can be activated or deactivated if necessary, by setting this switch to ON or OFF.

* This control does not affect the output signal of the camera.



7 Diopter adjustment ring

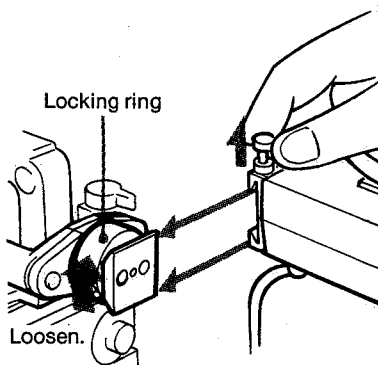
Adjusts the diopter. For details about adjustment procedures, refer to page 1-4.

8 Tally lamp

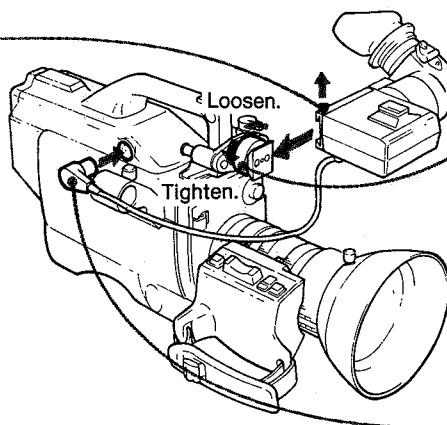
When the TALLY switch **6** is set to ON, this lamp operates the same as the REC/TALLY indicator **1**.

1-2. HOW TO ATTACH TO THE CAMERA

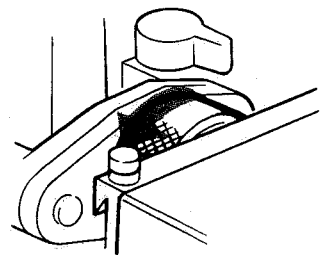
- 1** Loosen the lock ring, and align and slide the viewfinder into the mount while pulling the pin up.



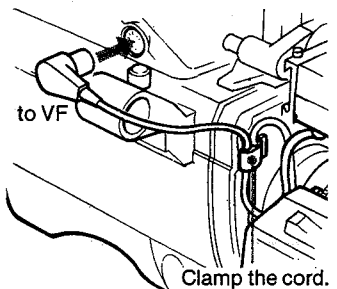
To detach the viewfinder, loosen the lock ring, and slide the viewfinder while pulling the pin up.



- 2** Tighten the lock ring.



- 3** Connect the viewfinder connector.



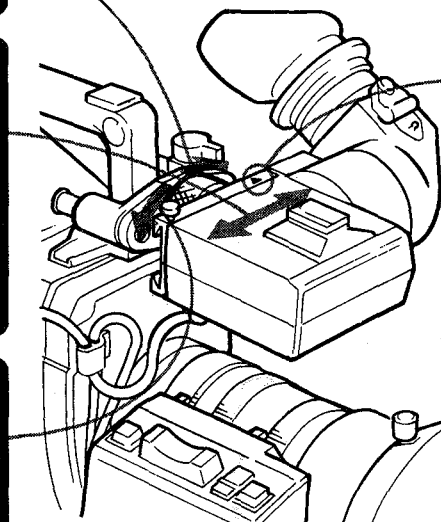
1-3. FOR EASY OPERATION OF THE VIEWFINDER

Adjustment of the horizontal position

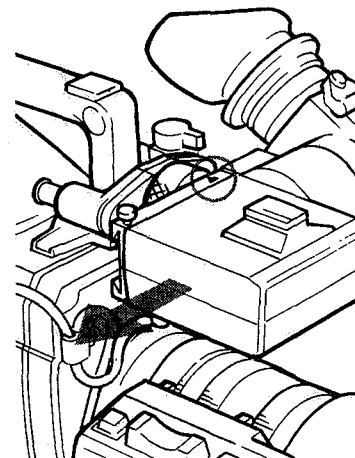
1 Loosen the lock ring.

2 Slide the viewfinder to the desired position.

3 Tighten the ring.

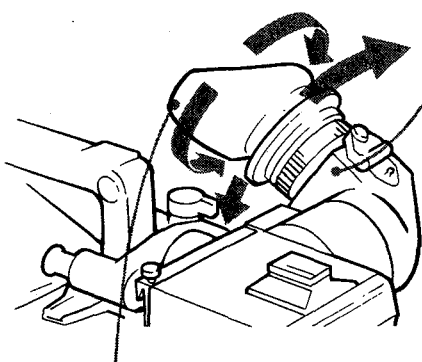


To insert the camera into the carrying case with the viewfinder attached to it, slide the viewfinder to the "▼" mark and tighten the lock ring.



Adjustment of the eye cup position

1 Move the eye cup up and down for comfortable use.

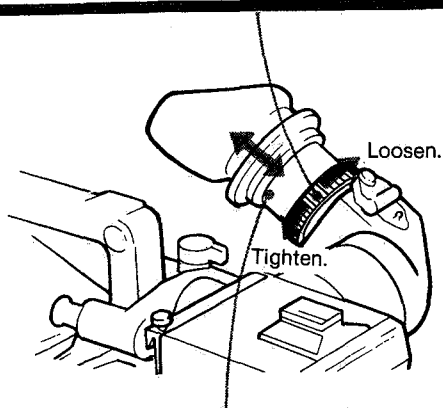


2 Rotate the eye cup to fit the eye.

1-4. DIOPTER ADJUSTMENT (ADJUSTABLE RANGE: FROM -1D TO -3D)

Since each operator's eyesight varies, it is necessary to adjust the diopter each time the viewfinder is used by a new operator. Adjust the diopter after focusing as follows.

1 Loosen the ring.



2 Slide this part back and forth so that the image can be monitored clearly.
Tighten the ring.

1-5. OPERATION

1 Turn on the power to the camera. The power is supplied to the viewfinder automatically.

2 Adjust the position and angle of the viewfinder screen for easy viewing as shown in "How to Attach to the Camera" on page 7.

3 Adjust the CONTR and BRIGHT controls for the best picture.

4 While recording, the picture shot by the camera appears on the screen, and the REC/TALLY indicator lights.

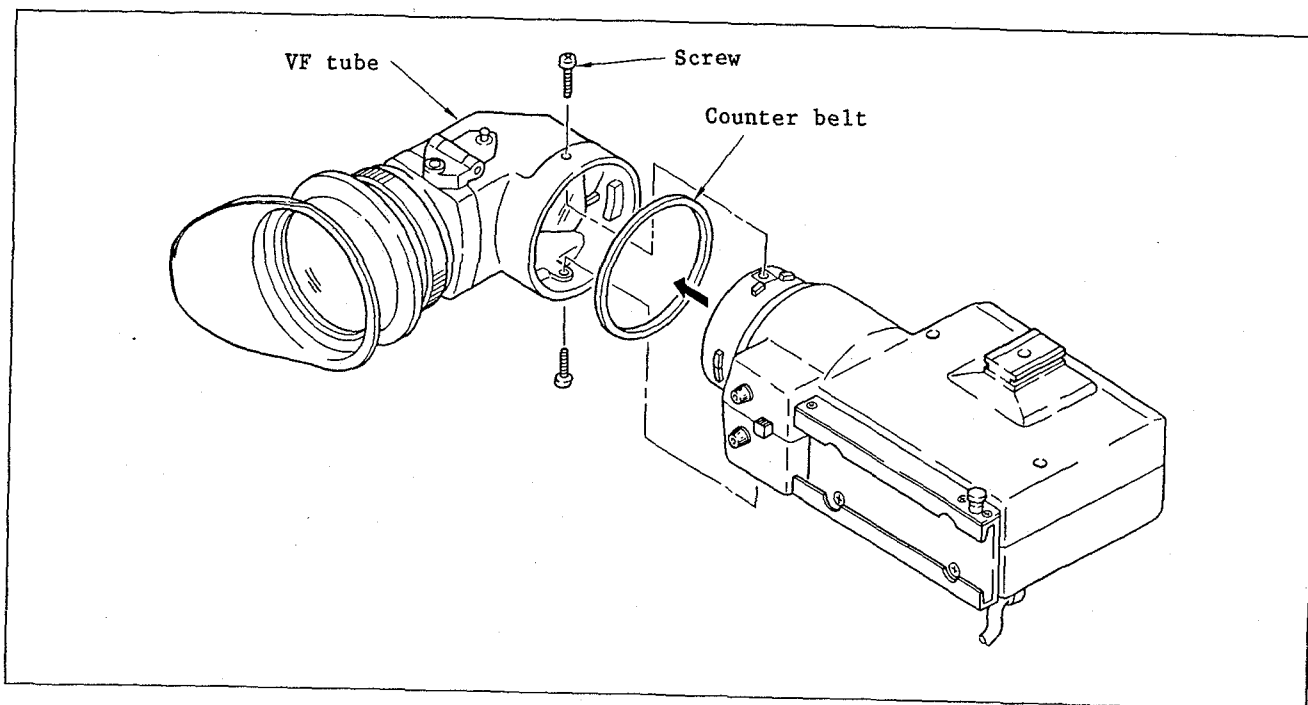
- When the VTR is in the playback mode, the playback picture appears on the screen.
- The settings of the CONTR and BRIGHT controls do not affect the video output signal of the camera.
- When the BRIGHT control is turned fully counterclockwise, the picture does not appear on the screen.

SECTION 2

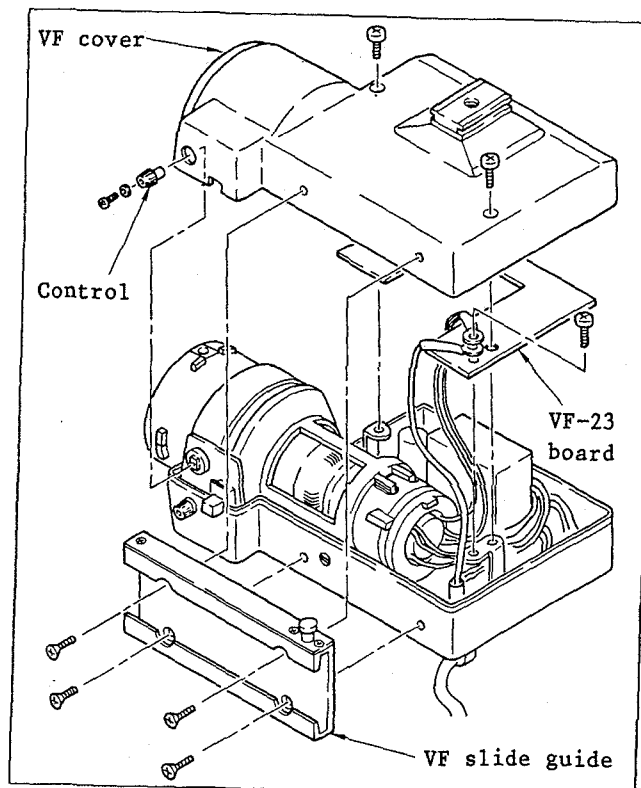
SERVICE INFORMATION

2-1. REPLACEMENT OF THE VIEWFINDER CRT

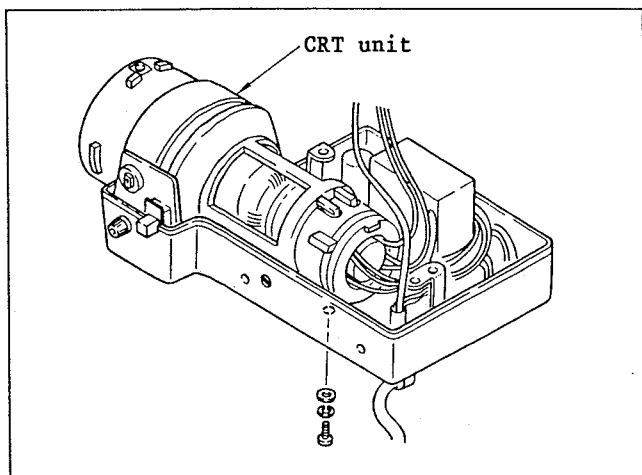
1. Remove the two screws shown below, disconnect the VF tube, and remove the counter belt.



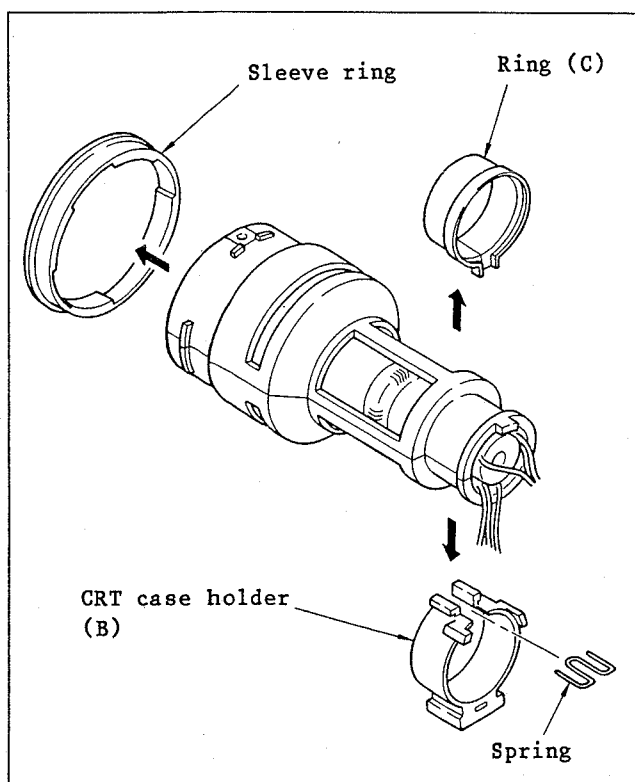
2. Remove the eight screws and one washer shown on the right and remove the VF slide guide, control, VF cover, and VF-23 board.



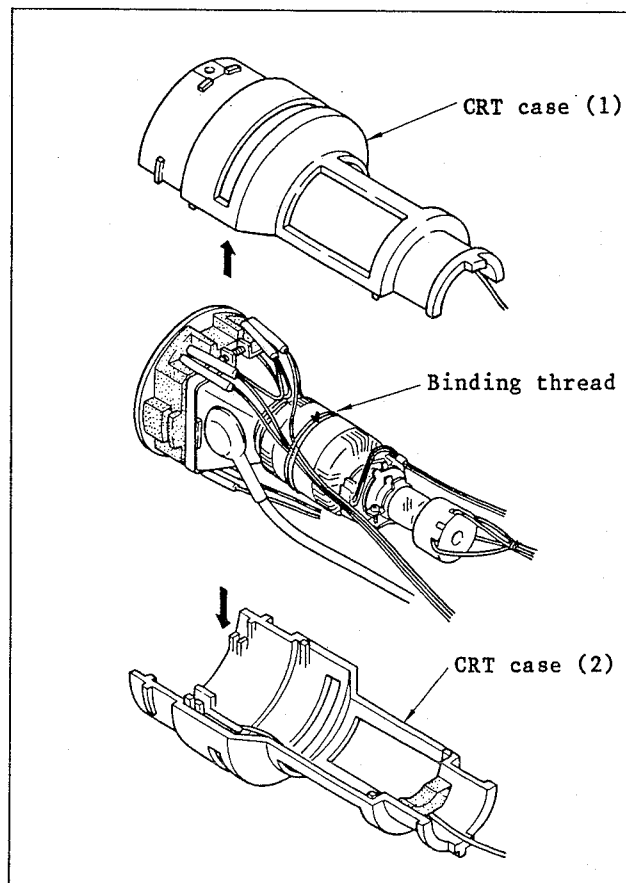
3. Remove the screw on the underside and remove the CRT unit.



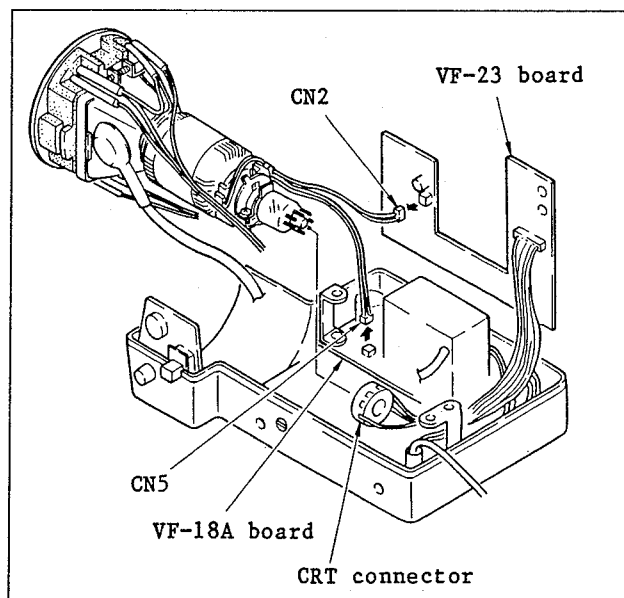
4. Remove the sleeve ring, spring, CRT case holder (B), and ring (C) from the CRT unit.



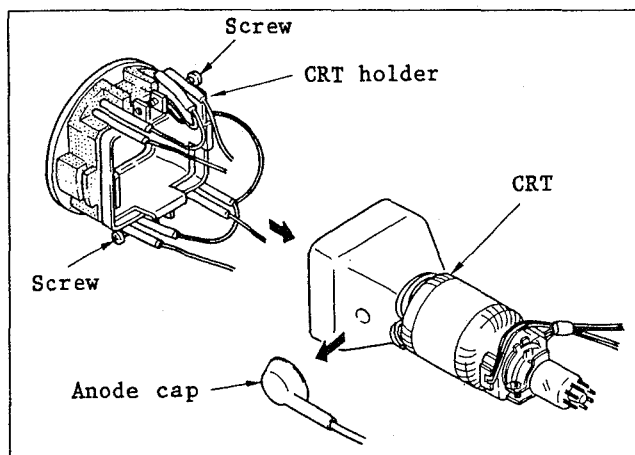
5. Remove CRT cases (1) and (2) and cut the binding thread shown below.



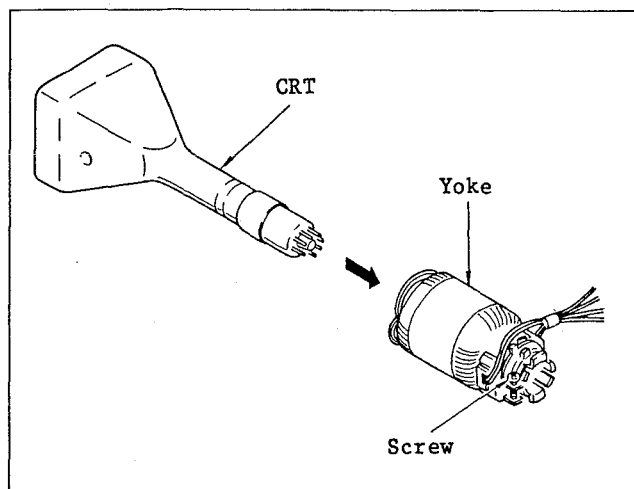
6. Disconnect CN2 from the VF-23 board and CN5 from the VF-18A board and the CRT connector from the CRT.



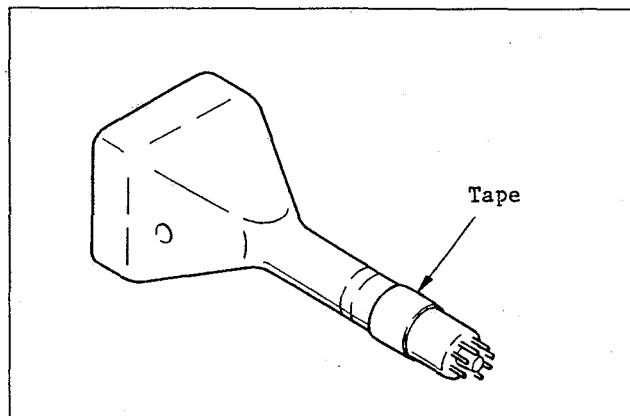
7. Loosen the two screws shown below and remove the CRT holder and the anode cap from the CRT.



8. Loosen the screw shown below and remove the yoke from the CRT.



9. Wrap the following portion of the new CRT with tape.

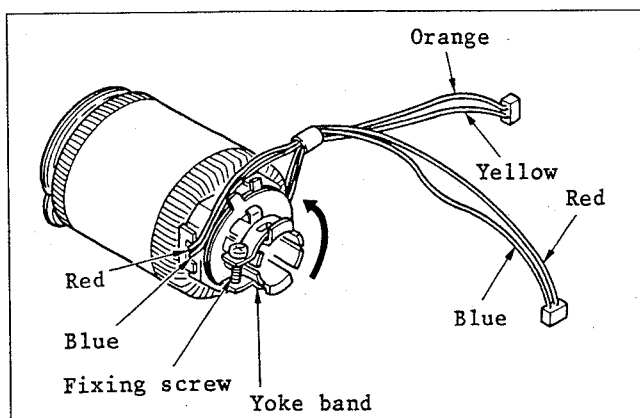


10. Reverse the procedures from 1 to 9 and incorporate a new CRT into the viewfinder.

Note: Take great care when handling the harness. Otherwise the harness may break when using the viewfinder.

2-2. REPLACEMENT OF THE DEFLECTION YOKE

1. To remove the deflection yoke, perform CRT replacement procedures 1 to 8.
2. Loosen the fixing screw of the band of the new deflection yoke, turn the yoke band until the fixing screw is located as shown below, and tighten the fixing screw. (Turn the yoke band so that the fixing screw is located at the red and blue wires.)



3. To install a new deflection yoke in the viewfinder, reverse procedures 1 and 2.

SECTION 3

ALIGNMENT

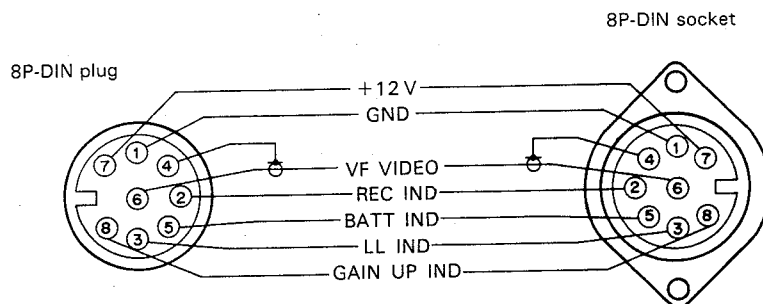
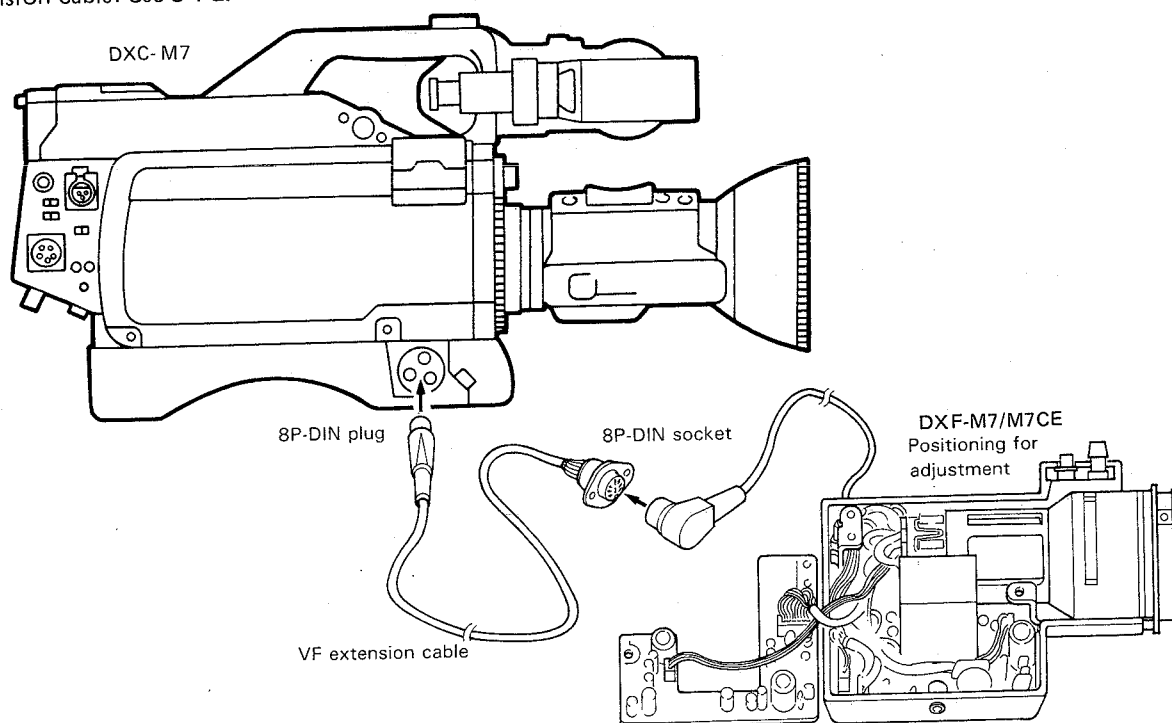
3-1. PREPARATION

3-1-1. Equipment Required

1. Pattern Box PTB-100 (UC, BRZ)
Sony part number J-6020-490-A
PTB-220 (EK)
Sony part number J-6020-680-A
PTB-500 (EK)
Sony part number J-6029-140-A
2. Resolution chart
Sony part number J-6021-870-A
3. Video Camera DXC-M7/M7P/M7PM
4. AC Adapter CMA-7/7CE or CMA-8/8CE
5. Camera Cable CCZO-A2
6. Black and White monitor PVM-91/91CE or equivalent
7. Digital multimeter
8. Dualtrace oscilloscope
9. VF extension cable: See 3-1-2.

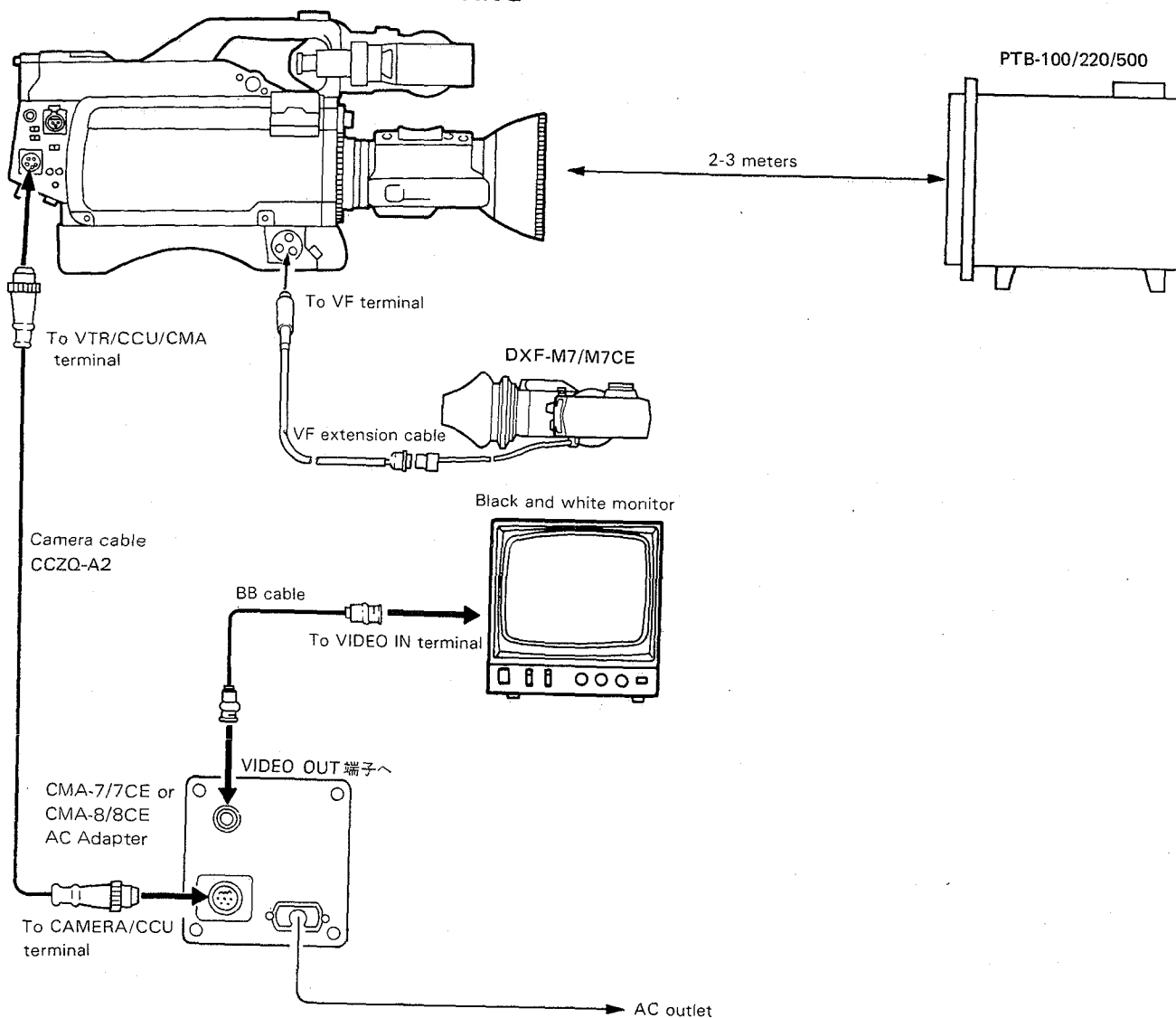
3-1-2. How to make the VF extension cable

- 8P-DIN plug (male) Sony part number 1-560-173-00
8P-DIN socket (female) Sony part number 1-561-320-00



DXF-M7 (UC, BRZ)
DXF-M7CE (EK)

3-2. CONNECTION AND INITIAL SETTING



3-2-1. Initial settings

1. Set the camera switches and controls as follows.

DXC-M7/M7P/M7PM Video Camera

BARS WB switch: AUTO

GAIN switch: 0 dB

PRF HEAT switch: ON

DXF-M7/M7CE Viewfinder

CONTRAST control: Fully clockwise

BRIGHTNESS control: Center

Lens

AUTO/MANUAL switch: AUTO

- ## 2. Preparation for picture

- (1) Adjust the zoom control so that the resolution chart frame touches the underscanned picture frame on the monitor.
- (2) Adjust the iris control for the best resolution of the monitor.

3-3. VF SYSTEM ADJUSTMENT

3-3-1. 9V Adjustment

Equipment: DC voltmeter

Test point: TP1 (GND:E1)/VF-18A board

Adjustment point: ⓪ RV1/VF-18A board

Specification: 9.0 ± 0.05 VDC

3-3-2. Focus Adjustment

Object: Resolution pattern

Preparations:

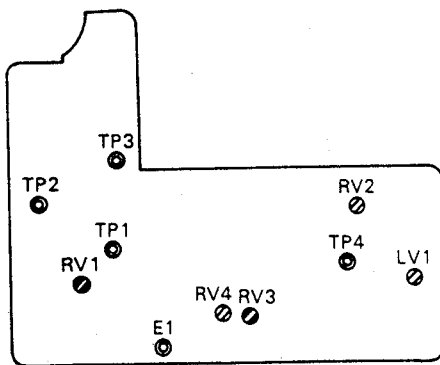
1. CONTRAST → Fully clockwise
2. BRIGHTNESS → Center
3. Adjust the RV4 (BRIGHT)/VF-18A board so that the gradation of the resolution pattern is seen clearly.

Adjustment point: ⓪ RV3 on the VF-18A board

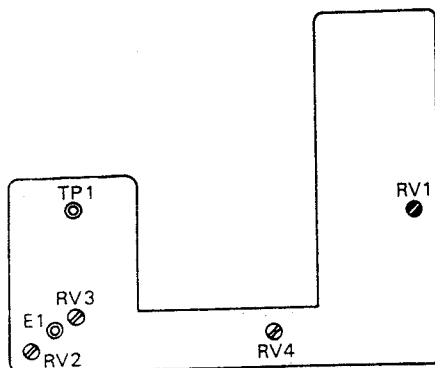
Adjustment: Adjust for the best resolution of the viewfinder.

Specifications:	Center	Circumference
Horizontal	More than 420	More than 350
Vertical	More than 350	More than 300

Note: If this adjustment is performed, adjust 3-3-6. V.H deflection size adjustment.



VF-18A board (component side)



VF-23 board (component side)

3-3-3. Horizontal hold adjustment

Equipment: Dual trace oscilloscope

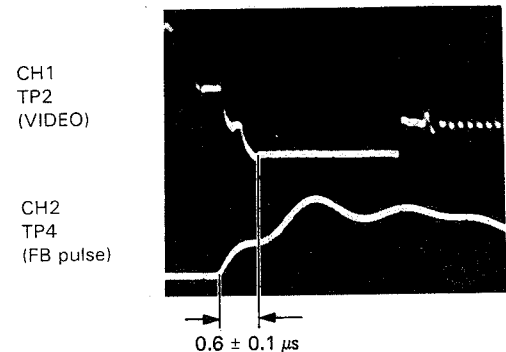
Test point: CH-1 TP2 (GND:E1) on the VF-18A board
CH-2 TP4 (GND:chassis) on the VF-18A board

Mode: ALT

Trigger: TP4/VF-18A board

Adjustment point: ⓪ RV1/VF-23 board

Specification: 0.6 ± 0.1 μ S



3-3-4. Vertical hold adjustment

Preparation: Set the PREHEAT switch on the DXC-M7/M7P/M7PM to OFF.

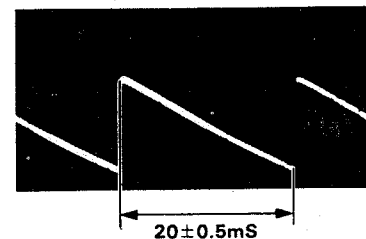
Equipment: Oscilloscope

Test point: TP1/VF-23 board

Trigger: CN1-1 pin/VF-23 board

Adjustment point: ⓪ RV4/VF-23 board

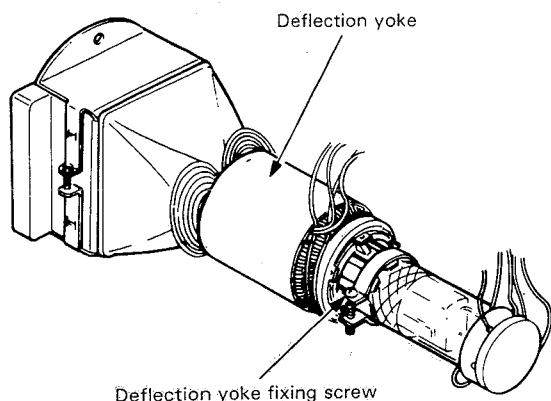
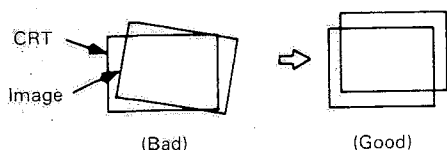
Specification: 20 ± 0.5 mS



3-3-5. Deflection yoke tilt adjustment

Note: 3-3-6. V.H deflection size adjustment, 3-3-7. Centering adjustment and this adjustment affect each other, so carry out these adjustments alternately several times.

- Adjustment: 1. Loosen the deflection yoke fixing screw, and turn the deflection yoke until any inclination on the viewfinder picture is eliminated.
2. After this adjustment is completed, tighten the fixing screw, pushing the deflection yoke toward the CRT.



3-3-6. V.H deflection size adjustment

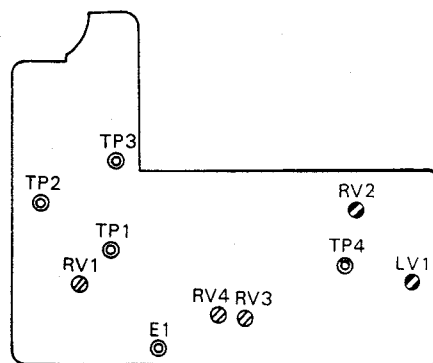
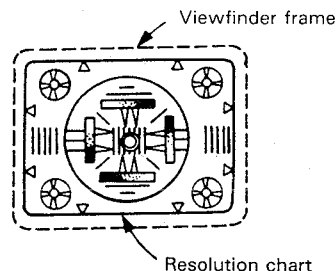
Note: 3-3-5. Deflection yoke tilt adjustment, 3-3-7. Centering adjustment and this adjustment affect each other, so carry out these adjustments alternately several times.

Object: Resolution chart

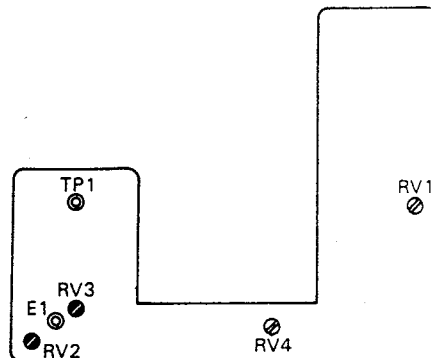
Preparation: 1. Set the external BRIGHT control at the center.

Adjust the external CONTR control so that the second gradation of the resolution chart is disappeared.

- Adjustment: 1. Adjust \odot RV2 (V SIZE) and \odot RV3 (V LIN)/VF-23 board so that the picture's high becomes $97\pm1\%$ ($3\pm1\%$ reduced scan) of viewfinder screen's high with best longitudinal balance of the circle.
2. Adjust \odot RV2 (H SIZE) and \odot LV1 (H LIN)/VF-18A board so that the picture's width becomes $98\pm1\%$ ($2\pm1\%$ reduced scan) of viewfinder screen's width with best lateral balance of the circle.



VF-18A board (component side)

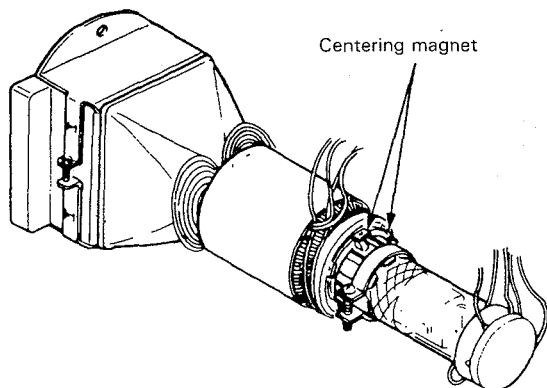


VF-23 board (component side)

3-3-7. Centering adjustment

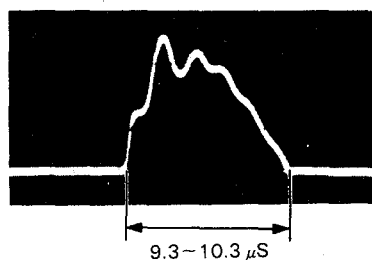
Note: 3-3-5. Deflection yoke tilt adjustment, 3-3-6. V.H deflection size adjustment and this adjustment affect each other, so carry out these adjustments alternately several times.

Adjustment: Turn the two centering magnets until the Hand V centerings are obtained.

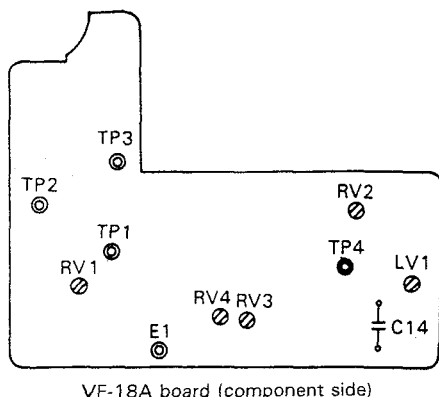


3-3-8. FB pulse wide adjustment

Equipment: Oscilloscope
 Test point TP4 (GND:EI)/VF-18A board
 Trigger: TP4/VF-18A board
 Specification: $9.3\ \mu\text{s}$ to $10.3\ \mu\text{s}$



Adjustment: C14/VF-18A board $0.001\ \mu\text{F}$ Select one of these for the specification.
 $0.0015\ \mu\text{F}$
 $0.0022\ \mu\text{F}$
 $0.0033\ \mu\text{F}$



VF-18A board (component side)

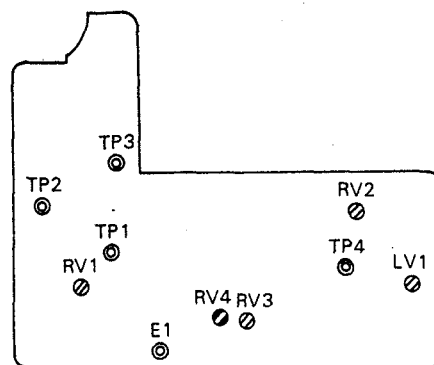
3-3-9. Bright calibration adjustment

Object: Resolution pattern

Preparation: Turn RV1/SW-91 board (BRIGHTNESS) → fully counterclockwise.

Turn RV2/SW-91 (CONTRAST) → fully clockwise.

Adjustment: Adjust the picture by turning RV4/VF-18A counterclockwise from the rightmost position so that the black and white gradation scale is black up to the third step and the fourth step is recognizable.



VF-18A board (component side)

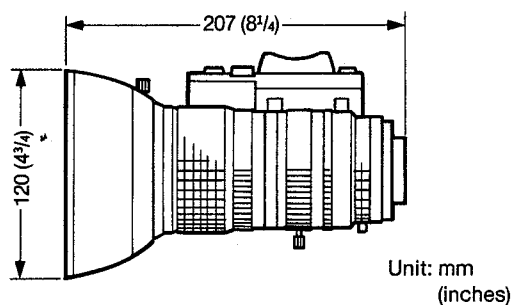
ZOOM LENS



SPECIFICATION

Focal length	9.5 mm to 143 mm
Zoom	Manual and motorized, selectable Zooming ratio: 15 ×
Maximum aperture ratio	1.8
Iris control	Manual and auto, selectable 1.8 to 16 and C (closed)
Range of object field (at the distance of 0.95 m)	W (wide angle): 601 × 801 mm (23 ³ / ₈ × 31 ⁵ / ₈ inches) T (telephoto): 41 × 54 mm (1 ⁵ / ₈ × 2 ¹ / ₄ inches)
Minimum object distance	0.95 m
Filter thread	82 mm dia., 0.75 pitch
Mount	Bayonet mount
Weight	Approx. 1.5 kg (3 lb 5 oz) with hood
Supplied accessory	Operating instructions (1)

Dimensions



SONY®
SERVICE MANUAL

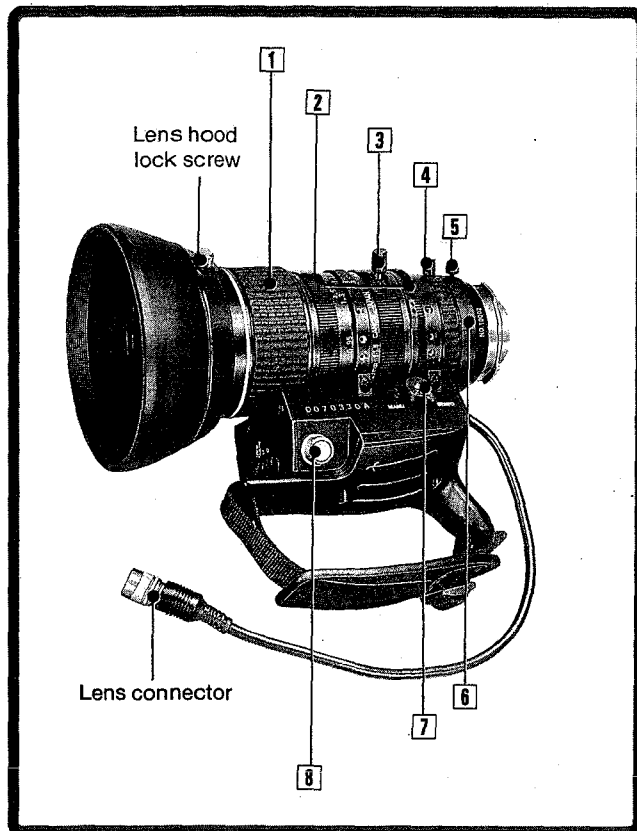
TABLE OF CONTENTS

1. GENERAL DESCRIPTION

1-1. Location and Function of Parts and Controls	1-1
1-2. How to Attach the Lens to the Camera ..	1-3
1-3. Flange Focal Length Adjustment.....	1-4
1-4. Iris Adjustment	1-5
1-5. Close-ups—Shooting Small or Nearby Object	1-5
1-6. Zooming	1-6

SECTION 1 GENERAL DESCRIPTION

1-1. LOCATION AND FUNCTION OF PARTS AND CONTROLS



1 Focus ring

Turn this ring for focusing.

2 Iris ring

For manual iris adjustment, turn this ring with the IRIS selector set to the M position.

3 Manual zoom lever

For manual zooming, turn this lever with the ZOOM selector set to the MANU position.

4 MACRO ring and lever

To use the close-up function, pull out the lever and turn the ring toward the arrow direction.

5 Ff (flange focal length) adjustment ring lock screw

Locks the Ff ring at the adjusted position.

6 Ff (flange focal length) adjustment ring

Turn to adjust the flange focal length.

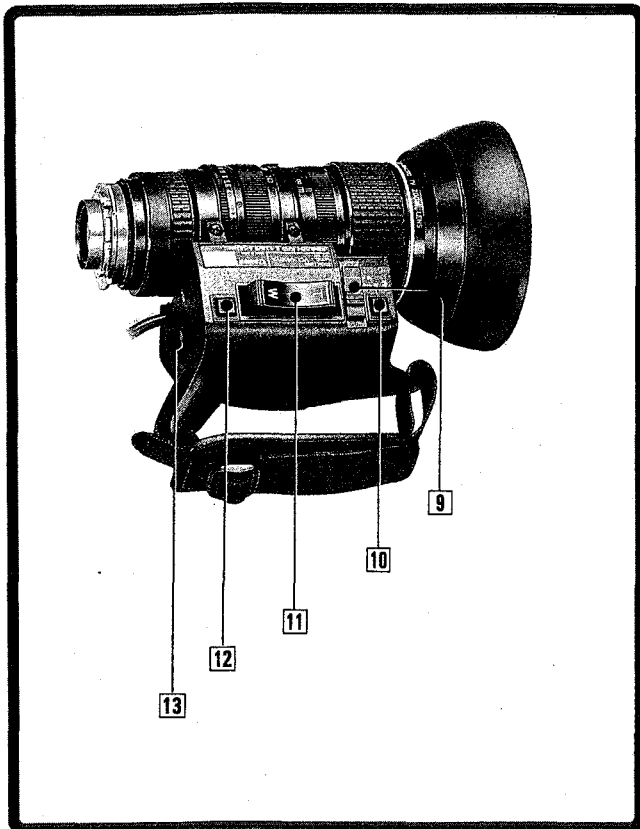
7 ZOOM selector

SERVO: For motorized zooming.

MANU (manual): For manual zooming.

8 Zoom remote control connector (8-pin)

Connect an LO-26 lens remote control unit (optional) for remote control of zooming.



9 IRIS adjustment selector

A (automatic): For automatic iris adjustment.

M (manual): For manual iris adjustment.

10 Momentary automatic iris adjustment button

The iris is automatically adjusted while this button is kept depressed when the IRIS selector is set to M. When the button is released, the iris will be fixed at the value that has just been obtained by the automatic adjustment until the iris is adjusted again manually.

11 Motorized zoom switch

Press either end of this switch for motorized zooming with the ZOOM selector set to SERVO: W for a wide-angle picture and T for a telephoto picture. Zooming is fast when the switch is pressed down all the way and becomes slower when the switch is pressed down slightly.

12 RET (return video) button

Press to view the return video or the playback picture from the VTR on the viewfinder screen. (For details, refer to the instruction manual supplied with the camera.)

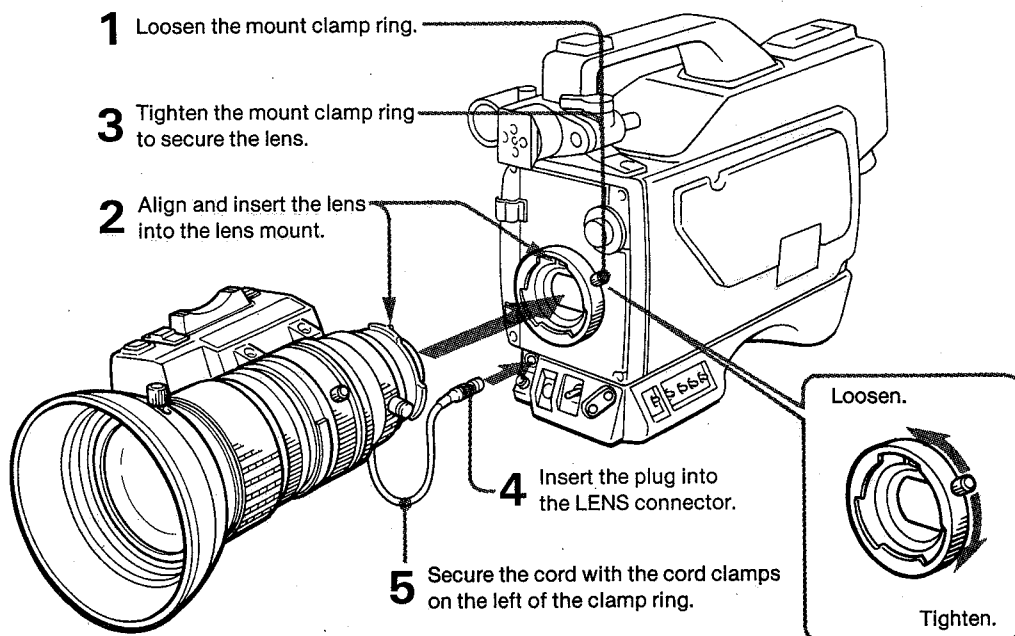
13 VTR button

When a portable VTR is connected to the camera, press this button to start and stop recording.

1-2. HOW TO ATTACH THE LENS TO THE CAMERA

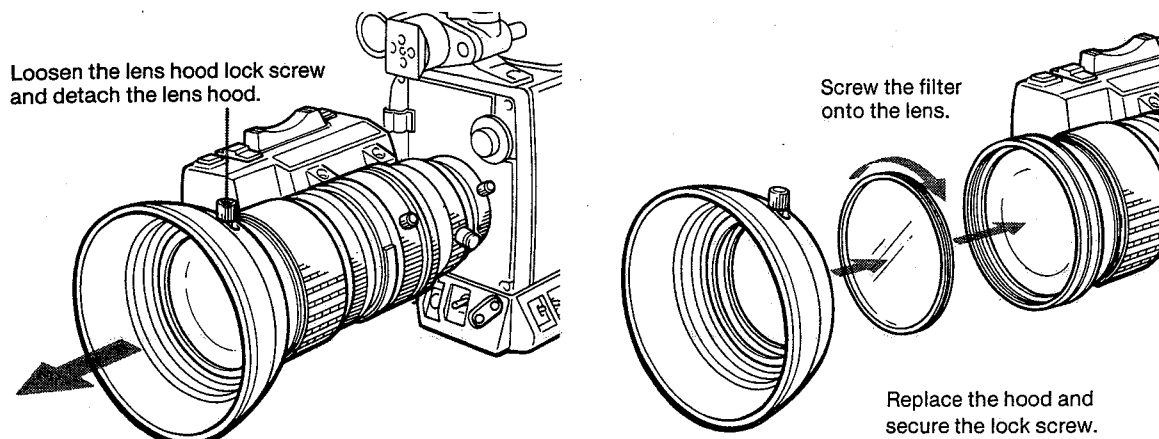
Note

If the protective cap is placed over the mount of the lens, remove it before attaching the lens.



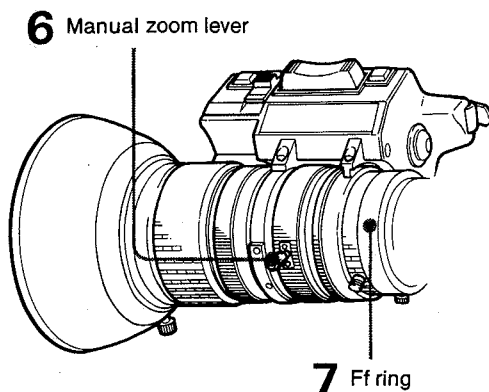
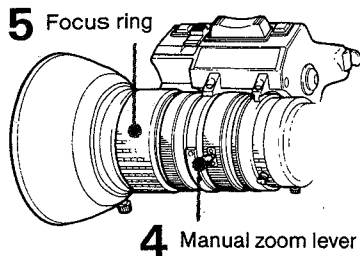
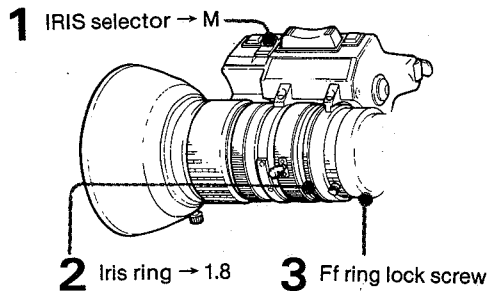
How to attach a filter to the lens

A filter can be attached to the lens body. We recommend detaching the lens hood from the lens first for easier attachment of the filter.



1-3. FLANGE FOCAL LENGTH ADJUSTMENT

The proper flange focal length adjustment insures that the object is in focus both at the wide-angle position and at the telephoto position when zooming.



1 Set the IRIS selector to M.

2 Set the Iris ring to "1.8".
Position an appropriate object and illuminate it so that the proper video level is obtained when the iris ring is set to "1.8".

3 Loosen the Ff ring lock screw.

4 Set the ZOOM selector to MANU and turn the manual zoom lever to the "143" telephoto position.

5 Turn the focus ring until an object at about three meters (10 feet) from the lens is in focus. An object with fine detail is desirable.

6 Turn the manual zoom lever to the "9.5" wide-angle position.

7 Turn the Ff ring until the same object is in focus.
Be sure not to turn the focus ring.

8 Repeat steps 4 through 7 until the object is in focus both at the telephoto position and at the wide-angle position.

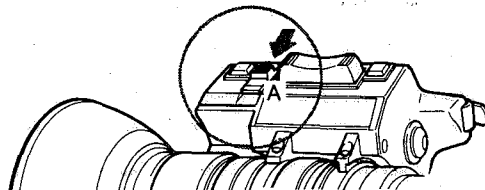
9 Tighten the Ff ring lock screw.

Once the flange focal length adjustment has been made, readjustment is not necessary as long as the lens stays mounted on the same camera.

1-4. IRIS ADJUSTMENT

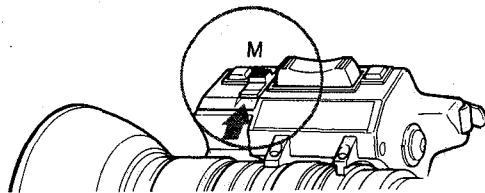
Automatic adjustment

Set the IRIS selector to A, and the iris will be automatically adjusted to the brightness of the object. Normally use the A position.



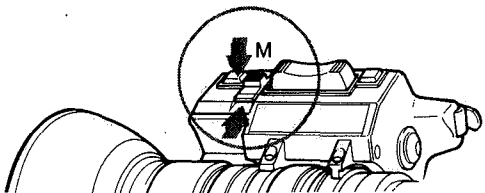
Manual adjustment

Set the IRIS selector to M, and turn the iris ring. Manual adjustment may be effective when recording an object against a bright sky or a scene with high contrast.



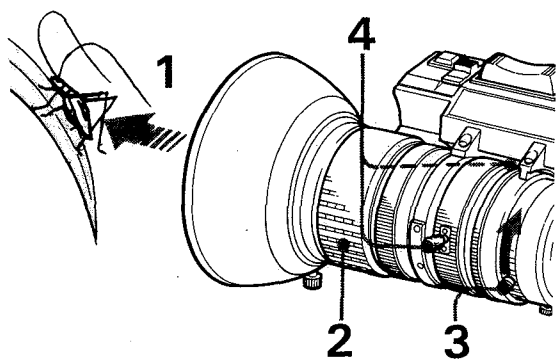
Temporary automatic adjustment

While the momentary automatic iris adjustment button is kept depressed during manual iris adjustment, the iris is automatically adjusted. When the button is released, the iris will be fixed at the value that has just been obtained by the automatic adjustment until the iris is adjusted again manually with the iris ring.



1-5. CLOSE-UPS — SHOOTING SMALL OR NEARBY OBJECT

The close-up or macro function lets you zoom in flowers, insects and even photographs. The minimum distance from the lens to the object is 10 mm in the "9.5" wide-angle zoom position.



1 Adjust the distance between the lens and the object to get the desired image size.

2 Set the focus ring to the " ∞ " setting.

3 Pull the lever and turn the MACRO ring in the direction of the arrow until it stops.

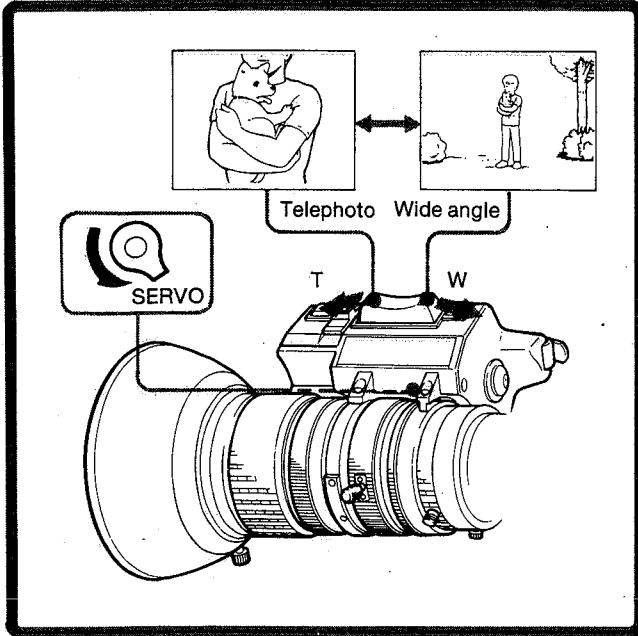
4 Focus by turning the manual zoom lever with the ZOOM selector set to "M".

When the close-ups operation is completed, return the MACRO ring to its click position.

1-6.ZOOMING

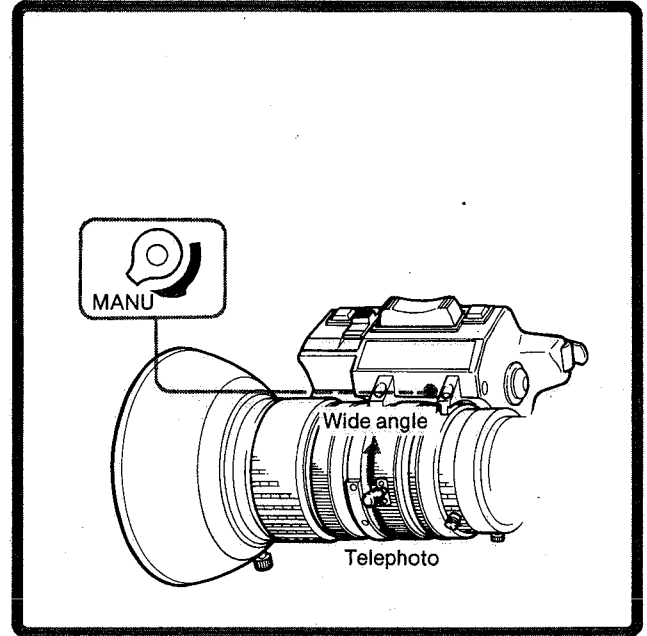
Motorized Zooming

You can zoom smoothly by pressing either end of the motorized zoom switch when the ZOOM selector is set to SERVO. Zooming is fast when the motorized zoom switch is pressed down all the way and becomes slower when the switch is pressed slightly.



Manual Zooming

Manual zooming allows more precise control of the zooming speed. You can zoom manually by manipulating the manual zoom lever with the ZOOM selector set to MANU.



Tips on Zooming

Zoom in

From wide angle to telephoto. Used to bring a distant object up close.

Correct focusing

If the focus is right in the telephoto position, it will be right when you zoom back to wide angle.

Zoom out

From telephoto to wide angle. Used to move back from an object and gradually reveal the object's surroundings.

For a more stable picture

We recommend placing the camera on a tripod when zooming. If you zoom with the camera on your shoulder, stand as steady as possible.

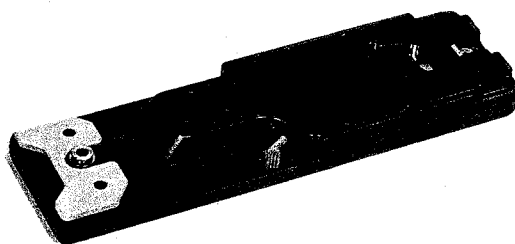
Following

Zoom up on the subject and follow its movement with the camera. This zoom effect is used, for example, to emphasize the speed of the subject by making the background rush past in a blur.

Positioning the object at the center of the screen

For zoom in operation, adjust the focus in the telephoto position, and set to the wide angle position. Then start zoom in operation. Otherwise the subject may be out of the screen during zooming in.

TRIPOD ATTACHMENT



SPECIFICATION

Dimensions	Approx. 282 x 27 x 80 mm (w/h/d) (11 ¹ / ₈ x 1 ¹ / ₈ x 3 ¹ / ₄ inches)
Weight	Approx. 0.9 kg (2 lb)

Design and specifications subject to change without notice.

TABLE OF CONTENTS

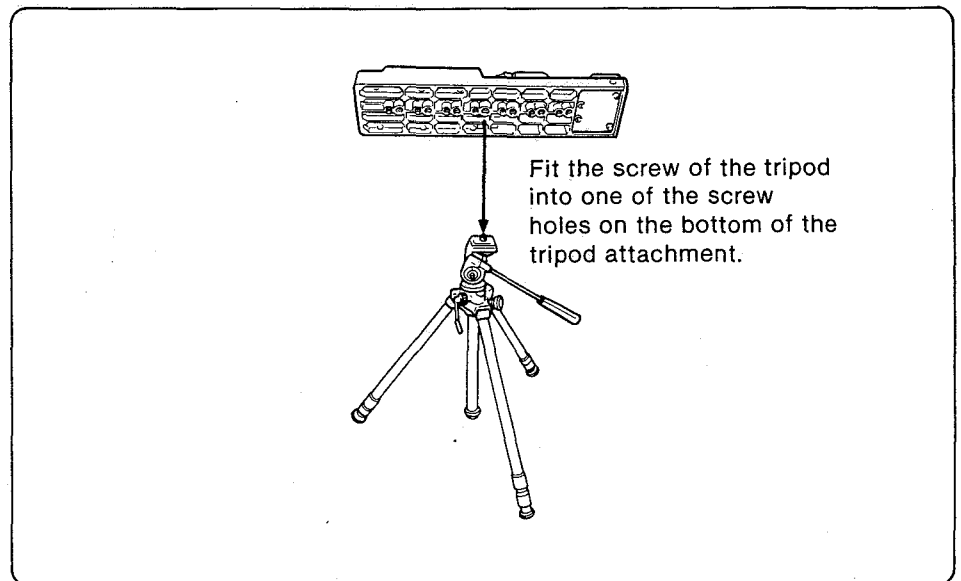
1. GENERAL DESCRIPTION

1-1. Attachment	1-1
1-2. How to Detach the CAMERA	1-2

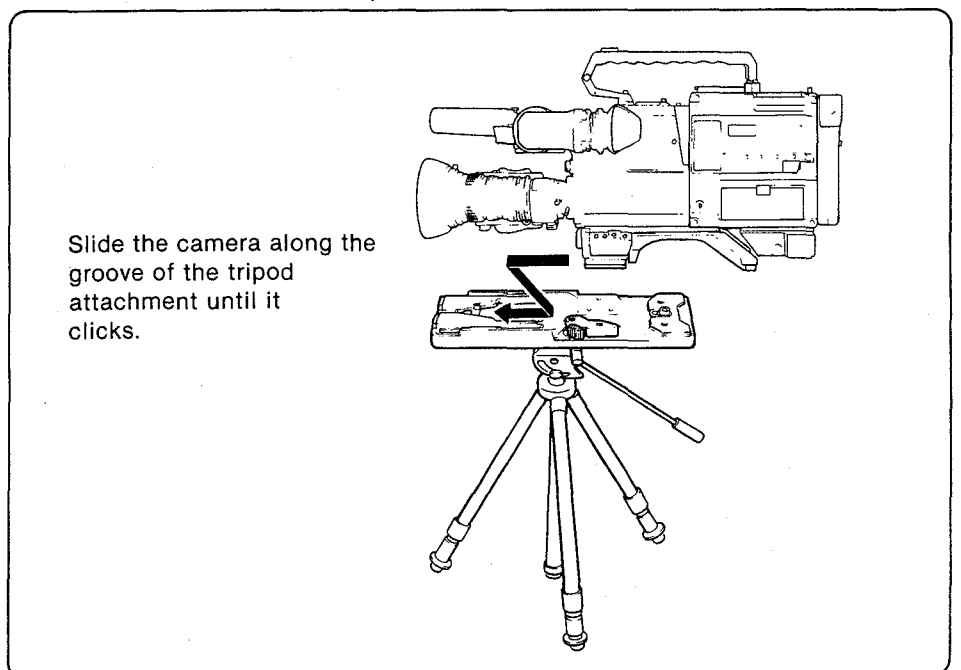
SECTION 1 GENERAL DESCRIPTION

1-1. ATTACHMENT

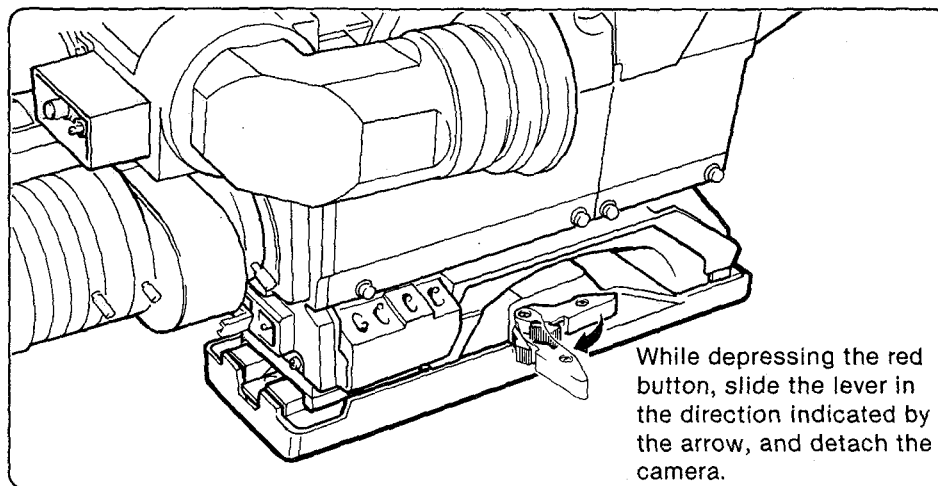
- 1** Attach the tripod attachment to the tripod.



- 2** Attach the camera to the tripod attachment.



1-2. HOW TO DETACH THE CAMERA



NOTE

While the camera holding pin remains in the center of the tripod attachment after the camera has been detached, the camera cannot be attached to the attachment. In that case, depress the red button, slide the lever in the direction indicated by the arrow and move the pin back to its proper position.

